

**RAINY CREEK / KOOTENAI RIVER BANK RESTORATION  
RECLAMATION/REVEGETATION SPECIFICATIONS**

**SDMS Document ID**



**2002574**

**PART 1      GENERAL**

**1.01    SCOPE OF WORK**

- A.    The Contractor shall furnish all labor, materials, equipment, tools, supervision, and incidentals necessary for the final reclamation and revegetation of the Screening Plant site as specified herein. This area includes the banks of the Kootenai River and the Rainey Creek drainage areas adjacent to the site.
1.    The Contractor shall reclaim excavated areas with materials specified herein to the grade shown on the Contract Drawings. Locations for reclamation activities shall be areas as indicated on the Contract Drawings.
  2.    The Contractor shall place, establish, and maintain seed on areas reclaimed with topsoil and other areas disturbed by construction activities.
  3.    The Contractor shall place, establish, and maintain plant materials at the locations shown on the Contract Drawings.
  4.    The Contractor shall place, establish, and maintain vegetative revetments at the locations shown on the Contract Drawings.
  5.    The Contractor shall provide operation and maintenance (O&M) of reclaimed areas as specified herein.

**1.02    REFERENCES**

- A.    The publications listed below form a part of this specification to the extent reference; publications are referred to in the text by basic designation only.
1.    Agricultural Marketing Service (AMS)
    - a.    AMS-01      (Aug 95) Federal Seed Act Regulations Part 201
  2.    American Nursery and Landscape Association (ANLA)
    - a.    ANLA ANSI/    (1996) Nursery Stock
    - b.    ANLA Z60.1
  3.    American National Standards Institute (ANSI)
    - a.    ANSI A300      (1995) Tree Care Operations - Trees, Shrubs, and other Woody Plant Maintenance
  4.    State of Montana
    - a.    Montana Code Annotated (MCA) 80-5    Agricultural Seed Requirements

### 1.03 SUBMITTALS

A. The following shall be submitted by the Contractor to the Contracting Officer's Representative as requested.

1. **Manufacturer's Literature**  
Manufacturer's literature discussing physical characteristics, application, and installation instructions for equipment, surface erosion control material, and chemical treatment material.
2. **Equipment List**  
A list of proposed pesticide application, seeding, planting, and mulching equipment to be used in performance of seeding operation, including descriptive data and calibration tests.
3. **Delivery Schedule**  
A delivery schedule shall be provided at least 10 days prior to the intended date of the first delivery.
4. **Application of Pesticide**  
Pesticide treatment plan with proposed sequence of pesticide treatment work. The pesticide trade name, chemical composition, formulation, concentration, application rate of active ingredients and method of application for all materials; and the name and state license number of the state certified applicator shall be included.
5. **Field Testing Reports**  
Results of any field tests.
6. **Maintenance Report**  
Written record of maintenance work performed.
7. **Seed Establishment Period**  
Written calendar time period for the seed establishment period. When there is more than one seed establishment period, the boundaries of the seeded area covered for each period shall be described.
8. **Plant Establishment Period**  
Calendar time period for the plant establishment period. When there is more than one establishment period, the boundaries of the planted areas covered for each period shall be described.
9. **Certificates of compliance certifying that materials meet the requirements specified, prior to the delivery of materials. Certified copies of the reports for the following materials shall be included.**
  - a. **Topsoil (Topsoil)**  
Topsoil characteristics for particle size, coarse fragment content, pH, organic matter content, textural class, and soluble salts shall meet the specifications identified by Volpe during the 2001 removal design.
  - b. **Seed**  
Seed origin, classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested. The Contractor shall supply

the Contracting Officer's Representative with all seed bag tags and a certification from the supplier stating that the seed complies with applicable local, State, and Federal regulations.

- c. Fertilizer  
Chemical analysis and composition percent.
- d. Mulch  
Composition and source.
- e. Pesticide  
EPA registration number and registered uses.
- f. Herbicide  
Registered name.
- g. Vegetative Revetment Material  
Plant material origin, classification, botanical name, common name, and size.
- h. Plant Material  
Plant material origin, classification, botanical name, common name, and size.
- i. Quantity Check  
Bag count or bulk weight measurements of material used compared with area covered, to determine the application rate and quantity installed.

#### 1.04 QUALITY ASSURANCE

- A. Quality assurance will be achieved through continual oversight of the Contractor's work by the Contracting Officer's Representative and using the specifications provided herein.

#### 1.05 SOURCE INSPECTION

- A. The source of delivered topsoil and agricultural fill material shall be subject to inspection.

#### 1.06 DELIVERY, INSPECTION, STORAGE, AND HANDLING

- A. Delivery  
A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.
  - 1. Delivered Topsoil  
Prior to the delivery of any topsoil, its availability shall be verified. A soil test shall be provided for topsoil delivered to the site. Topsoil containing any of the following materials shall be rejected: slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1½ -inch diameter; and topsoil that contains viable plants and plant parts. Unacceptable materials shall be removed from the job site.
  - 2. Soil Amendments  
Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers,

soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries. Amendments must be certified free of noxious weeds as designated by the State of Montana. Open soil amendment containers or wet soil amendments shall be rejected. Unacceptable materials shall be removed from the job site.

3. Pesticides/Herbicides

These materials shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses.

4. Plant Material Identification and Protection During Delivery

Plant material shall be identified with attached, durable, waterproof labels and weather-resistant ink, stating the correct botanical plant name and size. Plant material shall be protected during delivery to prevent desiccation and damage to the branches, trunk, root system, or earth ball. Branches shall be protected by tying-in. Exposed branches shall be covered during transport.

B. Inspection

1. Seed

Seed shall be inspected upon arrival at the job site for conformity to species and quality. Seed that is wet, moldy, or bears a test date five months or older, shall be rejected.

2. Plant Material

Plant material shall be well shaped and vigorous with a healthy, well-branched root system, free from disease, harmful insects and insect eggs, sunscald injury, disfigurement, or abrasion. Plant material shall be checked for unauthorized substitution and to establish nursery-grown status. Plant material showing desiccation, abrasion, sun-scald injury, disfigurement, or unauthorized substitution shall be rejected. The plant material shall exhibit typical form of branch to height ratio, and meet the caliper and height measurements specified. Plant material that measures less than specified, or has been poled, topped off or headed back shall be rejected. Container-grown plant material shall show new fibrous roots and the root mass shall contain its shape when removed from the container. Plant material with broken or cracked balls or broken containers shall be rejected. Unacceptable material shall be removed from the job site.

C. Storage

Materials shall be stored in designated areas. Seed, lime, and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and shall not be stored with seeding operation materials. Plant material not installed on the day of arrival at the site shall be stored and protected in designated areas. Plant material shall not be stored longer than 30 calendar days. Plant material shall be protected from direct exposure to wind and sun. Bare-root plant material shall be heeled in. All plant material shall be kept in a moist condition by watering with a fine mist spray until installed.

D. Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles. Plant material shall not be injured in handling. Cracking or breaking the earth ball of balled and burlapped plant material shall be avoided. Plant material shall not be handled by the trunk or stems.

E. Time Limitation

Hydroseeding time limitation for holding seed in the slurry shall be a maximum 24 hours. Except for container-grown plant material, the time limitation between digging and installing plant material shall be a maximum of 90 calendar days. The time limitation between installing the plant material and placing the mulch shall be a maximum of 24 hours.

1.07 WARRANTY

Furnished plant material shall have a warranty for plant growth to be in a vigorous growing condition for a minimum 12-month period which shall be provided regardless of the contract time period. When plant material is determined to be unhealthy in accordance with Paragraph 3.19.3 herein, it shall be replaced once under this warranty.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. The Contractor shall provide all materials and equipment in suitable and adequate quantity and quality as required to accomplish the work shown on the design drawings and specified herein.

2.02 SELECT FILL AND TOPSOIL

- A. Select fill and topsoil shall meet requirements and conditions set forth under the current contract to locate and place these materials at the site. These materials are as follows:
1. Common Fill (Type 1) - Shall be gravel, sandy gravel, or gravelly sand free of organic material, loam, wood, trash, snow, ice, frozen soil, and other objectionable material and shall be graded within the following limits: Sieve 6 inches – 100% passing, No. 4 – 20 to 70% passing, No. 200 – 0-10% passing.
  2. Agricultural Fill (Type 2) - This clean fill shall be composed of 20-40% sand, 10-25% clay and 50-70% silt and be classified as a silt-loam by the US Department of Agriculture classification system.
  3. Topsoil - Clean topsoil shall conform to Montana Public Works Standard Specifications Section 02910. Topsoil shall be loose, friable, loamy soil, free of excess acid and alkali, contain not less than 2% nor more than 20% organic matter as determined by the loss on ignition of oven dried samples (Reference ASTM D-2974) method. Topsoil shall also not contain objectionable amounts of sod, hard lumps, gravel, sub-soil or other undesirable material that would form a poor seedbed. Government sampling of this material will include analysis for nutrient levels, concentrations of organic matter, percent of cation exchange capacity (CEC), and soil texture. The clean topsoil will be capable of producing natural vegetation. Before stripping topsoil, ensure that it has supported the healthy growth of crops, grass or other desirable vegetation. The Government reserves the right to reject any fill or topsoil it deems unacceptable for use at the site.

A. Seed Classification

State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS-01 and applicable state seed laws. The following must appear on the label:

1. Lot number or other distinguishing mark.
2. The common name, genus, species, and subspecies, when applicable, including the name of each kind of seed present in excess of 5 percent. When two or more kinds of seed are named on the label, the label shall specify the percentage of each. When only one kind of seed is present in excess of 5 percent and no variety name or type designation is shown, the percentage must apply to seed of the kind named. If the name of the variety is given, the name may be associated with the seed of the kind named. The percentage in this case may be shown as "pure seed" and must apply only to seed of the variety named.
3. State or county of origin.
4. The approximate percentage of viable seed, together with the date of the test. When labeling mixtures, the percentage of viability of each kind shall be stated.
5. The approximate percentage by weight of pure seed, meaning the freedom of seed from inert matter and from other seeds.
6. The approximate percentage by weight of sand, dirt, broken seeds, sticks, chaff, and other inert matter.
7. The approximate total percentage by weight of other seeds.
8. The name and approximate number of each kind of species of prohibited and restricted noxious weed seeds occurring per pound of seed.
9. The full name and address of the person, firm, or corporation selling the seed.

A. Seed Species and Mixtures

Seed species shall be proportioned by weight as shown in Table 2.

**Table 2 Revegetation Seed Mixture**

Botanical Name	Common Name	Drill Seeding	Broadcast or Hydro Seeding
		Pounds Pure Live Seed per Acre	
Festuca ovina, var. Covar	sheep fescue	1	2
Bromus marginatus, var. Bromar	mountain brome	3	6
Phleum alpinum	alpine timothy	1.5	3
Thinopyrum intermedium	intermediate wheatgrass	1	2
Elymus lanceolatus	streambank wheatgrass	2.5	5
Elymus canadensis	Canada wildrye	1.5	3
Elymus trachycaulus	slender wheatgrass	1	2
Pseudoroegneria spicata	bluebunch wheatgrass	1.5	3
<b>Total Perennial Grass</b>		13	26
Astragalus cicercicer	milkvetch	2.5	
Lotus corniculatus	birdsfoot trefoil	2.5	
Secale cereale	cereal rye	3	6

B. Quality

1. As listed in the State of Montana regulations, seed shall contain no "PROHIBITED" noxious weed seed. The seed shall contain no "RESTRICTED" noxious weed seed in excess of the maximum numbers per pound as specified by the State of Montana or as specified by the appropriate county Weed Board, whichever is more stringent.
2. The number of seeds allowed per pound, for all other noxious weed seeds shown on the State of Montana "restricted list" shall be 0.
3. All seed shall be a standard grade adapted to Montana conditions. Seed which has become wet, moldy, or otherwise damaged shall be rejected.

C. Seed Mixing

Seed shall be delivered pre-mixed to the site to the extent practicable. If seed mixing on site is required, it shall be done in the presence of the Contracting Officer's Representative.

D. Substitutions

Substitutions will not be allowed without written request to and approval from the Contracting Officer's Representative.

## 2.04 PLANT MATERIAL

A. Plant Material Classification

The plant material shall be nursery grown stock conforming to ANLA ANSI/ANLA Z60.1 and shall be the species specified herein. Shrub and tree species must be comparable to those species removed during the reclamation; they must be of the same seasonal variety, adapted to the climate and habitat, and be native to the area. Plant material species, size, and planting frequency are shown in Table 3 and on the Contract Drawings.

**Table 3 Plant Material**

Botanical Name	Common Name	Size	Quantity
<b>Kootenai River</b>			
Salix exigua	sandbar willow	10 in <sup>3</sup> tube	200
		3 gallon	80
Rosa woodsii	Wood's rose	10 in <sup>3</sup> tube	300
Rosa nutkana	Nootka rose	10 in <sup>3</sup> tube	110
Rubus parviflorus	thimbleberry	10 in <sup>3</sup> tube	300
		1 gallon	40
Cornus sericea	red-osier dogwood	10 in <sup>3</sup> tube	350
		Total	1,380
<b>Rainey Creek</b>			
Populus trichocarpa	black cottonwood	10 in <sup>3</sup> tube	230
		1 gallon	20
Betula occidentalis	water birch	1 gallon	50
Spiraea douglasii	rose spirea	1 gallon	50
Salix bebbiana	Bebb willow	10 in <sup>3</sup> tube	100
Alnus incana	mountain alder	1 gallon	80
		2 gallon	20
Alnus viridis sinuata	Sitka alder	10 in <sup>3</sup> tube	100
Rosa nutkana	Nootka rose	1 gallon	500
		Total	700

- B. Substitutions  
Substitutions will not be permitted without written request and approval from the Contracting Officer's Representative.
- C. Quality  
Well-shaped, well-grown, vigorous plant material having healthy and well-branched root systems in accordance with ANLA ANSI/ANLA Z60.1 shall be provided. Plant material shall be provided free from disease, harmful insects and insect eggs, sunscald injury, disfigurement, and abrasion. Plant material shall be free of shock or damage to branches, trunk, or root systems, which may occur from the digging and preparation for shipment, method of shipment, or shipment. Plant quality is determined by the growing conditions, method of shipment to maintain health of the root system, and growth of the trunk and crown as follows.
- D. Growing/Climatic Conditions  
Plant material varieties or cultivars shall be native to or well suited to the growing and climatic conditions of the project site.
- E. Method of Shipment to Maintain Health of Root System
  - 1. Balled and Burlapped (BB) Plant Material  
Ball size and ratio shall be in accordance with ANLA ANSI/ANLA Z60.1. The ball shall be of a diameter and depth to encompass enough fibrous and feeding

root system necessary for the full recovery of the plant. The root ball shall be completely wrapped with burlap or other suitable material and securely laced with biodegradable twine.

2. Potted (Pot) Plant Material  
Potted plant material shall be in accordance with ANLA ANSI/ANLA Z60.1. The root mass shall encompass enough fibrous and feeding root system to enable the plant to fully recover following planting. The container shall be sufficiently rigid to hold the root mass securely and protect it during shipping.
3. Container-Grown (C) Plant Material  
Container size and ratio shall be in accordance with ANLA ANSI/ANLA Z60.1. Plant material shall be grown in a container over a duration of time for new fibrous roots to have developed and for the root mass to retain its shape and hold together when removed from the container. The container shall be sufficiently rigid to hold the root mass and protect it during shipping.

- F. Growth of Trunk and Crown  
Coniferous Evergreen plant material (if utilized) shall have the height-to-spread ratio recommended by ANLA ANSI/ANLA Z60.1. Acceptable plant material shall be exceptionally heavy, well shaped, and trimmed to form a symmetrical and tightly knit plant.
- G. Plant Material Measurement  
Plant material measurements shall be in accordance with ANLA ANSI/ANLA Z60.1.

## 2.06 SOIL AMENDMENTS

- A. General  
Based on the specifications for fill material and topsoil (identified above), no pH adjusters or soil conditioners, such as additional organic matter, are anticipated.
- B. Fertilizer  
Fertilizer shall be controlled release commercial grade, free flowing, and uniform in composition. The nutrient ratio shall be 34 percent nitrogen, 52 percent phosphorus, and 60 percent potassium. The fertilizer shall be derived from sulfur coated urea, urea formaldehyde, plastic or polymer coated pills, or isobutylenediurea (IBDU). Fertilizer shall be balanced with the inclusion of trace minerals and micro-nutrients. Fertilizer to be used will supply the aforementioned quantities of available chemical elements. The fertilizer shall be uniform in composition, shall be in good condition for application by suitable equipment, and shall be labeled with the manufacturer's guaranteed analysis as governed by applicable State of Montana fertilizer laws. The Contractor shall apply fertilizer at a rate of 150 pounds per acre.

## 2.07 MULCH

- A. Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region and applied at a rate of 2 tons per acre.
- B. Straw  
Straw shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.
- C. Hydromulch

Hydromulch may be applied to the affected areas after those areas have been seeded.

2.08 WATER

- A. Water shall be the responsibility of the Contractor, unless otherwise noted. Water shall not contain elements or compounds toxic to plant life.

2.09 PESTICIDE AND HERBICIDE

- A. Pesticide shall be insecticide, fungicide, nematocide, rodenticide, or miticide. For the purpose of this specification, a soil fumigant shall have the same requirements as a pesticide. Both pesticides and herbicides shall be U. S. Environmental Protection Agency (EPA) registered and approved.

2.10 SURFACE EROSION CONTROL MATERIAL

- A. Surface erosion control material and implementation shall conform to the specifications provided on the Contract Drawings.

2.11 PLANT MATERIAL STAKING AND GUYING MATERIALS

- A. Wood stakes shall be hardwood or fir, rough sawn, free from knots, rot, cross grain, or other defects that would impair their strength.
- B. Wood Staking Material
  - 1. Bracing Stake  
Wood bracing stakes shall be a minimum 2-inch by 2-inch square and a minimum 8 feet long with a point at one end. Stake shall be set without damaging rootball.
  - 2. Wood Ground Stakes  
Wood ground stakes shall be a minimum of 2-inch by 2-inch square and a minimum 3 feet long with a point at one end.
- C. Metal Staking and Guying Material  
Metal stakes shall be aluminum or steel consisting of recycled content made for holding plant material in place.
  - 1. Bracing Stakes  
Metal bracing stakes shall be a minimum 1-inch diameter and a minimum 8 feet long. Stake shall be set without damaging rootball.
  - 2. Metal Ground Stakes  
Metal ground stakes shall be a minimum ½-inch diameter and a minimum 3 feet long.
  - 3. Earth Anchor  
Metal earth anchors shall be a minimum ½-inch diameter and a minimum 2 feet long.
  - 4. Guying Material  
Metal guying material shall be a minimum 12-gauge wire. Multi-strand cable shall be woven wire. Guying material tensile strength shall conform to the size of tree to be held firmly in place.

5. Turnbuckle  
Metal turnbuckles shall be galvanized or cadmium-plated steel and shall be a minimum 3 inches long with closed screw eyes on each end. Screw thread tensile strength shall conform to the size of tree to be held firmly in place.

D. Plastic Staking and Guying Material

Plastic shall consist of recycled plastic product made for holding plant material firmly in place. Plastic shall not be used for deadmen.

1. Plastic Bracing Stakes  
Plastic bracing stakes shall be a minimum 2-inch diameter and a minimum 8 feet long. Stake shall be set without damaging rootball.
2. Plastic Ground Stakes  
Plastic ground stakes shall be a minimum 1-inch diameter and a minimum 3 feet long.
3. Plastic Guying Material  
Plastic guying material shall be designed specifically for the purpose of firmly holding plant material in high wind velocities.
4. Chafing Guard  
Plastic chafing guards shall be used to protect tree trunks and branches when metal is used as guying material. The material shall be the same color throughout the project site. Length shall be a minimum 1.5 times the circumference of the plant trunk at its base.

D. Rubber Guying Material

Rubber chafing guards, consisting of recycled material, shall be used to protect tree trunks and branches when metal guying material is applied. The material shall be the same color throughout the project. Length shall be a minimum 1.5 times the circumference of the plant trunk at its base.

2.12 FLAGGING

- A. Plastic flag material shall be used on guying material. It shall be a minimum 6 inches long. Tape color shall be consistent and visually complimentary to the entire project area.

2.13 WOODY PLANT PROTECTORS

- A. Corrugated tree protectors shall be placed around the trunks of tree species to protect them from rodents and other animals.

**PART 3 EXECUTION**

3.01 SELECT BACKFILL AND TOPSOIL PLACEMENT

- A. Select Fill Placement  
Backfilling the site has been completed and meets previously identified specifications.
- B. Topsoil Placement
  1. On areas to receive topsoil, the subgrade soil (agricultural fill) shall be scarified to a 2-inch depth for bonding with the topsoil and to allow root penetration.

2. At least 6 inches of topsoil, meeting the previously identified specifications, shall be placed uncompacted to the grade and areal extent shown on the Contract Drawings. Requirements for topsoil are specified on Table 1. Seeding shall be accomplished as specified herein only when areas are brought to finished grade.

### 3.02 FINISHED SOIL SURFACE

- A. The finished surface shall be reasonably smooth, uncompacted, and free from major irregular surface changes. The degree of finish shall be that ordinarily obtainable from dozer operations, except as otherwise specified. Any ditches and gutters shall be finished to permit adequate drainage.
- B. Newly graded areas shall be protected from traffic and from erosion, and any settlement or washing away that may occur from any cause, prior to acceptance, shall be repaired and grades reestablished to the required elevations and slopes. All work shall be conducted in accordance with the environmental requirements of the Contract, which includes State of Montana best management practices.

### 3.03 SEED BED PREPARATION AND CONDITION

- A. **Finished Grade and Topsoil**  
The Contractor shall verify that finished grades have been completed as indicated on the Contract Drawings and in accordance with Paragraphs 3.1 and 3.2 herein, prior to the commencement of the seeding operation.
- B. **Tillage Depth and Slope Steepness**  
Soil on slopes up to a maximum 2.5-horizontal-to-1-vertical shall be tilled to approximately 4-inch in depth. Tilling shall be done on the contour to help reduce overland surface water flow and erosion. Steeper slopes shall be left smooth to accept protective soil matting. Drainage patterns shall be maintained as indicated on drawings. The pH adjuster?, fertilizer, and soil conditioner? may be applied during this procedure.
- C. **Seedbed Condition**  
The Contracting Officer's Representative shall confirm that the seed bed surface, prior to beginning the seeding, is not be excessively dry, wet, snow-covered, or frozen, and that the seed bed surface is reasonably free of large lumps, clods, and impervious crusts of topsoil. The seed bed surface, to a depth of approximately 4 inches, shall not be so tightly compacted that seed cannot begin growth. The objective for the seed bed is to create a moderately rough surface using standard agricultural equipment.

### 3.04 SEEDING TIME AND EQUIPMENT CALIBRATION

- A. **Seeding Time**  
Seeding shall be permitted from April 30 through October 15. The Contractor shall obtain permission from the Contracting Officer's Representative prior to beginning seeding to ensure that topsoil placement and seedbed preparation meet the specifications described herein and on the Contract Drawings.
- B. **Equipment Calibration**  
Calibration tests shall be conducted on the equipment to be used immediately prior to the commencement of seeding operations. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified seeding

rate criteria. The equipment shall be calibrated a minimum of once every day during the operation. The calibration test results shall be immediately provided to the Contracting Officer's Representative.

### 3.05 SEEDING, MULCHING, AND WATERING

#### A. General Seeding Conditions

Prior to seeding, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of Paragraph 3.2. No seeding will take place when the wind velocity prevents uniform seed distribution; seeding procedure shall ensure even coverage. Seeding method shall be approved by the Contracting Officer's Representative. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved by the Contracting Officer's Representative. In general, drill seeding will be accomplished on slopes less than 2.5-horizontal-to-1-vertical steepness; hydroseeding shall be used on steeper slopes.

##### 1. Drill Seeding

Seed shall be uniformly drilled to a maximum ½-inch depth and at the rate specified in Table-2 using equipment having drills a maximum 7 inches distance apart. Row markers shall be used with the drill seeder. Half the total rate of seed application shall be drilled in one direction, with the remainder of the seed rate drilled at 90 degrees from the first direction. The drilling equipment shall be maintained with half full seed boxes during the seeding operations.

##### 2. Hydroseeding

Seed shall be added to water and thoroughly mixed to meet the rates specified. The time period for the seed to be held in the slurry shall be a maximum 24 hours. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled. Mulch shall not be applied to the seed bed simultaneously with the seed; mulch must be applied in a second application overtop the seed.

##### 3. Rolling

The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 2.5-horizontal-to-1 vertical shall not be rolled. Areas seeded with seed drills equipped with rollers shall not be rolled. Hydroseeded areas shall not be rolled.

#### B. Mulching

##### 1. Straw Mulch

Straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

##### 2. Mechanical Anchor

Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3. Wood Cellulose Fiber, Paper Fiber, and Recycled Paper  
Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. The mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

C. Watering Seed

Watering shall be started immediately after completing the seeding of an area using the irrigation system as shown on the Contract Drawings. Water shall be applied to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum 1-inch depth. Run-off and puddling shall be prevented.

### 3.06 INSTALLING PLANT MATERIAL TIME AND CONDITIONS

A. Plant Material Time

Trees and shrubs planting operations shall be performed only during periods when beneficial results can be obtained. This is generally at times and under conditions recommended by the nursery. When drought, excessive moisture, frozen ground, or other unsatisfactory conditions prevail, the work shall be stopped at the direction of the Contracting Officer's Representative. When special conditions warrant a variance to the planting operations, proposed planting times shall be submitted to the Contracting Officer's Representative for approval.

### 3.07 SITE PREPARATION FOR PLANT MATERIAL

A. Layout

Plant material locations, as shown on the Contract Drawings, shall be staked on the project site before any planting is made. Following inspection by the Contracting Officer's Representative, the location of plant material may be adjusted to meet project objectives and in consideration of field conditions.

B. Protecting Existing Vegetation

Existing vegetation shall be protected.

### 3.08 EXCAVATION FOR PLANT MATERIAL INSTALLATION

- A. Plant pits for balled and burlapped or container-grown plant material shall be dug to a depth equal to the height of the root ball as measured from the base of the ball to the base of the plant trunk. Plant pits for bare-root plant material shall be dug to a depth equal to the height of the root system. Plant pits shall be dug a minimum 50 percent wider than the ball or root system to allow for root expansion. The pit shall be constructed with sides sloping towards the base as a cone, to encourage well-aerated soil to be available to the root system for favorable root growth. Cylindrical pits with vertical sides shall not be used.

### 3.09 PLANT MATERIAL INSTALLATION

A. Setting Plant Material

Plant material shall be set plumb and held in position until sufficient soil has been firmly placed around root system or ball. In relation to the surrounding grade, the plant material shall be set even with the grade at which it was grown.

B. Backfill Procedure

Prior to backfilling, all metal, wood, synthetic products, or treated burlap devices shall be removed from the ball or root system avoiding damage to the root system. The backfill procedure shall remove air pockets from around the root system. Additional requirements are as identified below.

1.     Balled and Burlapped, and Balled and Platformed Plant Material  
Biodegradable burlap and tying material shall be carefully opened and folded back from the top a minimum 1/3 depth from the top of the root ball. Backfill mixture shall be added to the plant pit in 6-inch layers with each layer tamped.
  2.     Container-Grown and Balled and Potted Plant Material  
The plant material shall be carefully removed from containers that are not biodegradable. Prior to setting the plant in the pit, a maximum 1/4 depth of the root mass, measured from the bottom, shall be spread apart to promote new root growth. For plant material in biodegradable containers, the container shall be split prior to setting the plant with container. Topsoil mixture shall be added to the plant pit in 6-inch layers with each layer tamped.
  3.     Earth Berm  
An earth berm, consisting of topsoil soil mixture, shall be formed with a minimum 4-inch height around the edge of the plant pit to aid in water retention and to provide soil for settling adjustments. These shall be inspected by the Contracting Officer's Representative.
- C.     Watering  
Plant pits shall be watered immediately after backfilling, until completely saturated. Watering will continue throughout the first full growing season on at least a weekly basis via the engineered sprinkler system constructed at the site. Refer to the Contract Drawings for details on the sprinkler system.
- D.     Staking and Guying  
Staking shall be used when trees are unstable or will not remain set due to their size, shape, or exposure to high wind velocity.
- E.     Pruning  
Pruning shall be accomplished by trained and experienced personnel. The pruning of trees shall be in accordance with ANSI A300. Only dead or broken material shall be pruned from installed plants. The typical growth habit of individual plant material shall be retained. Clean cuts shall be made flush with the parent trunk. Improper cuts, stubs, dead, and broken branches shall be removed. "Headback" cuts at right angles to the line of growth will not be permitted. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off."
- F.     Flagging  
A flag shall be securely fastened to each guy line equidistant between the tree and the stake, deadmen, or earth anchor.
- G.     Trunk Protectors  
Corrugated tree trunk protectors shall be installed per manufacturers' specifications.
- H.     Big Game Repellant  
Big game repellant shall be applied to all planted trees and shrubs per the manufacturers' specifications immediately following planting.

### 3.10 SURFACE EROSION CONTROL

- A. Where indicated or as directed by the Contracting Officer's Representative, surface erosion control material shall be installed in accordance with manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material or without deviation to finished grade.

### 3.11 QUANTITY CHECK

- A. For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of material used shall be compared with the total area covered to determine the rate of application used. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

### 3.12 PESTICIDE APPLICATION

- A. When application of a pesticide becomes necessary to remove a pest or disease, a pesticide treatment plan shall be submitted to and approved by a Contracting Officer's Representative.

A state certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations. Clothing and personal protective equipment shall be used as specified on the pesticide label. A closed system is recommended as it prevents the pesticide from coming into contact with the applicator or other persons. Water for formulating shall only come from designated locations. Filling hoses shall be fitted with a backflow preventer meeting local plumbing codes or standards. Overflow shall be prevented during the filling operation. Prior to each day of use, the equipment used for applying pesticide shall be inspected for leaks, clogging, wear, or damage. Any repairs are to be performed immediately. A pesticide plan shall be submitted.

### 3.13 RESTORATION AND CLEANUP

- A. Restoration  
Existing turf areas, pavements, and facilities that have been damaged from the seeding operation shall be restored to original condition at Contractor's expense.
- B. Cleanup  
Excess and waste material shall be removed from the seeded and planted areas and shall be disposed offsite in accordance with the general construction contract for this site.
- C. Reclamation of Temporary Access Roads and Disturbed Areas  
Temporary access road removed and other areas disturbed by construction activities shall be reclaimed using the seed mixture and the implementation and maintenance specifications provided herein.

### 3.14 PROTECTION OF INSTALLED AREAS

- A. Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed by the Contracting Officer's Representative.

### 3.15 SEED ESTABLISHMENT PERIOD

#### A. Definition and Goal

The seed establishment period is defined as one full growing season after seeding. The goal is to obtain a robust stand of perennial, non-weedy, herbaceous vegetation by the end of the establishment period that is capable of stabilizing the topsoil against erosion. Written calendar time period shall be furnished for the seed establishment period. If there is more than 1 seed establishment period, the boundaries of the seeded area covered for each period shall be described and delineated on the site map and made known to the Contracting Officer's Representative.

#### B. Seeding Success/Failure

The success of the seeding(s) will be assessed beginning at the germination stage when grass species are approximately 1-inch in height and shall continue monthly during the establishment period. A satisfactory stand of vegetation shall have a minimum of 10 grass seedlings per square foot. Areas exceeding 50 ft<sup>2</sup> that have less than 10 grass seedlings per square foot shall be re-seeded by hand. In addition, the entire site must be re-seeded if more than 10% of the seeded area fails to meet the above criteria. In this event, the Contracting Officer's Representative must be notified immediately and re-seeding shall not be initiated until the probable cause of the seeding failure is ascertain and written permission is provided by a Contracting Officer's Representative.

#### C. Maintenance During Establishment Period

Maintenance of the seeded areas shall include eradicating weeds, insects, and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-seeding fertilization.

##### 1. Weed Control

The reclaimed areas shall be inspected for weeds each month during the establishment period. Weeds are defined as all plants considered by the state and county noxious or undesirable weed species. Noxious weeds are those regulated by law or those that are difficult to control. In general, noxious weeds are non-native plants that compete with desirable plants for nutrients, water, and/or space. Areas containing abundant weeds shall be hand-sprayed with a broadleaf herbicide. Only those areas containing weeds shall be sprayed (i.e., the entire reclaimed areas shall not be blanket sprayed). Spraying shall be completed in this manner that ensures the complete protection of the seeded forbs and the planted shrubs and trees. Herbicides shall not be applied if wind could carry the chemicals to the planted shrubs and trees. Herbicides shall be applied by a licensed certified applicator.

##### 2. Post-Seeding Fertilization

If deemed appropriate by the on-site Contracting Officer's Representative, fertilizer shall be applied to the site at the rate of 150 pounds per acre. The application shall be timed prior to the advent of winter dormancy (i.e., just prior to the end of the first full growing season).

##### 3. Pesticide Treatment

Treatment for disease or pests shall be in accordance with Paragraph 3.12 herein.

##### 4. Big Game Repellant

In addition to applying big game repellant immediately following planting, a second application shall be applied at a time recommended by the manufacturer.

5. Repair or Reinstall  
Unsatisfactory stand of grass plants and mulch shall be repaired or reinstalled and eroded areas shall be repaired as described herein.
6. Maintenance Record  
A record of each site visit shall be furnished to the Contracting Officer's Representative describing the maintenance work performed, areas repaired or reinstalled, and diagnosis for unsatisfactory stand of grass plants.

### 3.16 PLANT ESTABLISHMENT PERIOD

#### A. Definition and Goal

The plant establishment period for maintaining installed plant material in a healthy growing condition is defined as one full growing season after planting. The goal is to have all planted tree and shrubs in a thriving condition by the end of the establishment period. Written calendar time period(s) shall be furnished for the establishment period(s). If there is more than one establishment period, the boundaries of these areas shall be described and delineated on the site map and made known to the Contracting Officer's Representative.

#### B. Maintenance During Establishment Period

Maintenance of plant material shall include straightening plant material; straightening stakes; tightening guying material; correcting girdling; supplementing mulch; pruning dead or broken branch tips; maintaining plant material labels; watering; eradicating weeds, insects, and disease; post-planting fertilization; and removing and replacing unhealthy plants.

##### 1. Watering Plant Material

The plant material shall be watered as necessary to prevent desiccation and to maintain an adequate supply of moisture within the root zone. Trees and shrubs will be watered by hand or from a truck immediately upon planting. An adequate supply of soil moisture is estimated to be the equivalent of 1 inch of water infiltrated (absorbed by the soil) per week during the growing season, delivered in the form of rain or augmented by watering via the constructed irrigation system. Runoff, puddling, and wilting shall be prevented. Unless otherwise directed by the Contracting Officer's Representative, watering trucks shall not be driven over seeded areas.

##### 2. Weeding

Weeds in the tree and shrub planted areas shall not be allowed to reach a maximum 6-inches in height before being removed by hand; herbicide shall not be used in the tree and shrub planted areas.

##### 3. Post-Fertilization

The plant material shall be topdressed at least once during the period of establishment with controlled release fertilizer. The Contractor shall apply fertilizer at the rate of 2 pounds per 100 square feet of plant pit area. Dry fertilizer adhering to plants shall be flushed off. The application shall be timed prior to the advent of winter dormancy.

##### 4. Plant Pit Settling

If settling occurs, topsoil soil shall be added to the plant pit until the topsoil level is equal to the surrounding grade. Serious settling that affects the setting of the

plant in relation to the maximum depth at which it was grown requires replanting in accordance with the specifications herein. The earth berms around the planted trees and shrubs shall be maintained.

5. Maintenance Record

A record shall be furnished describing the maintenance work performed, the quantity of plant losses, diagnosis of the plant loss, and the quantity of replacements made on each site visit.

C. Unhealthy Plant Material

A tree shall be considered unhealthy or dead when the main leader has died back, or a minimum 25 percent of the crown has died. A shrub shall be considered unhealthy or dead when a minimum 25 percent of the plant has died. This condition shall be determined by scraping on a branch an area 1/16 inch square, maximum, to determine if there is a green cambium layer below the bark. The Contractor shall determine the cause for unhealthy plant material and shall provide recommendations for replacement. Unhealthy or dead plant material shall be removed immediately and shall be replaced as soon as seasonal conditions permit.

D. Replacement Plant Material

Unless otherwise directed, the same species and plant size shall be provided for replacement and the installation shall occur as specified herein. An extended plant establishment period, to be determined by the Contracting Officer's Representative, shall be required for replacement plant material.

### 3.17 FINAL ACCEPTANCE

A. Preliminary Inspection

Prior to the completion, a preliminary inspection shall be held by the Contracting Officer's Representative to determine the acceptability of the seeded area and plant materials based on the specifications provided herein. Time for the inspection shall be established in writing. An unacceptable stand of grass or plant material shall be repaired as soon as conditions permit.

B. Final Inspection

A final inspection shall be held by the Contracting Officer's Representative to determine that deficiencies noted in the preliminary inspection have been corrected. Time for the inspection shall be established in writing.

### 3.18 LONG-TERM MAINTENANCE OF ESTABLISHED SEED AND PLANT MATERIAL

A. The Contractor shall conduct maintenance of seed and plant material for a period of one year after the establishment periods (i.e., at the end of the second full growing season).

B. Maintenance of Established Seed

Maintenance of vegetation established from seed shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and fertilization in accordance with the specifications provided herein.

C. Maintenance of Established Plant Material

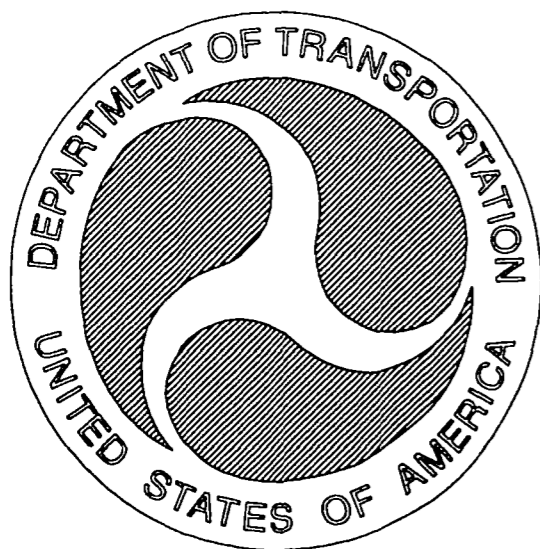
Maintenance of plant material shall include straightening plant material; straightening stakes; tightening guying material; correcting girdling; supplementing mulch; pruning dead or broken branch tips; maintaining plant material labels; watering; eradicating

weeds, insects and disease; fertilization; and removing and replacing unhealthy plants in accordance with the specifications provided herein.

D. Maintenance Record

The Contractor shall record each site visit during the long-term maintenance period, describing the maintenance work performed, areas repaired or reinstalled, and diagnosis for unsatisfactory stands of grass and plant materials and make this information available to a Contracting Officer's Representative.

**END OF SECTION**



U.S. DEPARTMENT OF TRANSPORTATION  
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION

JOHN A. VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER  
ENVIRONMENTAL ENGINEERING DIVISION, DTS-33  
55 BROADWAY, KENDALL SQUARE  
CAMBRIDGE, MASSACHUSETTS 02142

## RAINY CREEK / KOOTENAI RIVER BANK RESTORATION

LINCOLN COUNTY, MONTANA  
JUNE, 2002

### LIST OF DRAWINGS

<u>SHEET NO.</u>	<u>TITLE</u>
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G1	COVER SHEET
C1	RAINY CREEK EXISTING CONDITIONS PLAN
C2	RAINY CREEK NEW BACKFULL CHANNEL LAYOUT
C3	RAINY CREEK NEW BACKFULL CHANNEL LAYOUT
C4	RAINY CREEK PLAN AND PROFILE
C5	RAINY CREEK PLAN AND PROFILE
C6	RAINY CREEK SECTIONS
C7	STEP-POOL DETAILS
C8	SITE REVEGETATION PLAN
C9	STREAM BANK DETAILS

CONTRACTOR SUPPORT PROVIDED BY:



Federal Programs Corporation

consulting  
engineering  
construction  
operations

34 N. LAST CHANCE  
SUITE 104  
HELENA, MONTANA 59601

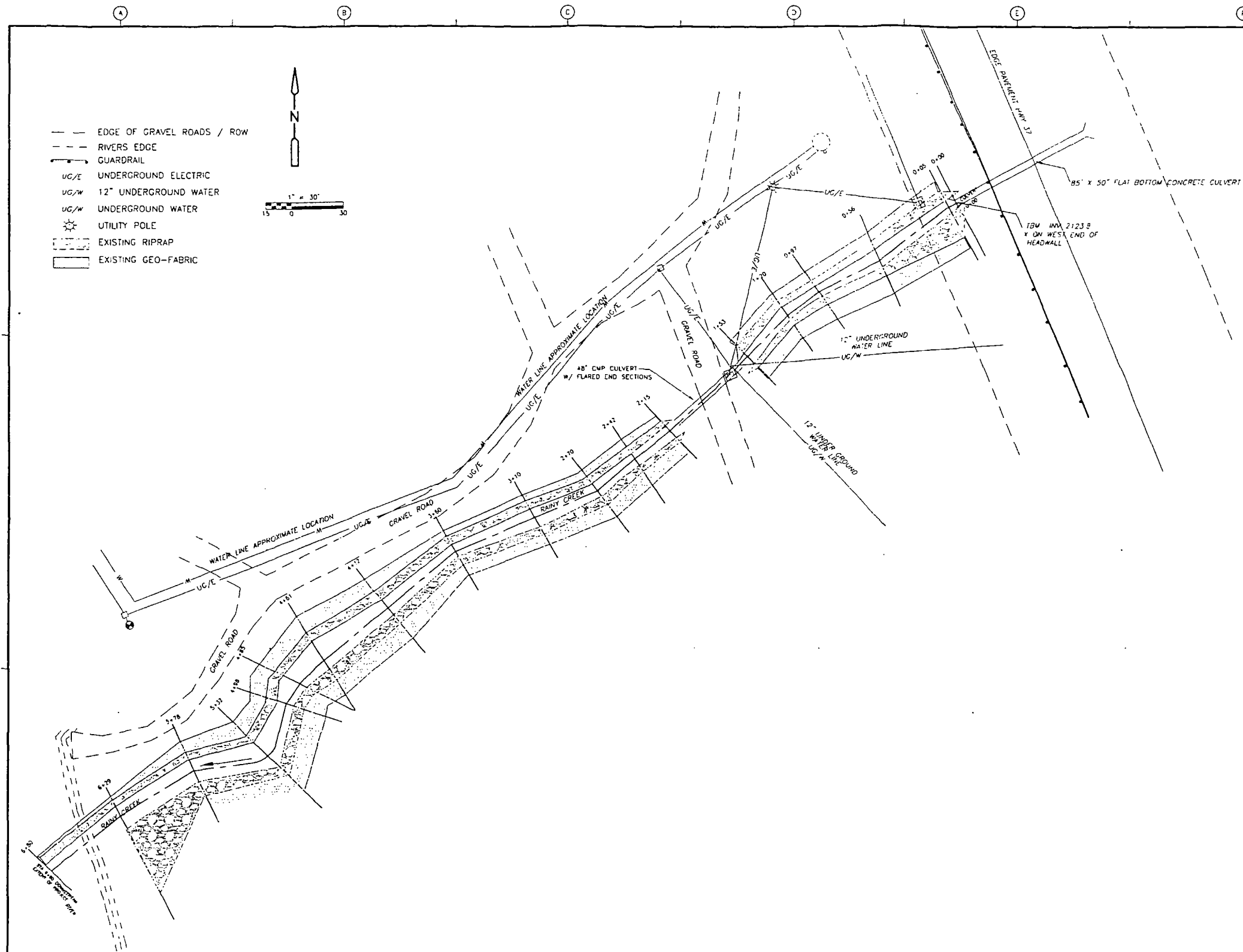
ACCEPTED BY: \_\_\_\_\_

MELVIN G. & LERAH LORENE PARKER

DATE: \_\_\_\_\_

PRELIMINARY FOR REVIEW ONLY

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#### EXISTING CONDITIONS GENERAL NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF CURRENT CONDITIONS AND LOCATIONS OF ALL THE EXISTING ITEMS WITHIN OR ADJACENT TO THE WORK, OR THAT MAY BE DISTURBED BY THE WORK.
2. LOCATIONS OF ALL EXISTING UTILITIES, STRUCTURES, PROPERTY LINES, SUBSURFACE SOIL OR ROCK CONDITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AND SHOWN LOCATIONS MAY BE NOT EXACT. IN ADDITION, ALL EXISTING UTILITIES MAY NOT BE SHOWN. FEATURES SHOWN IN PROFILE ARE LOCATED AT APPROXIMATE ELEVATIONS ONLY. IN PARTICULAR, ALL UNDERGROUND UTILITY LINES, UNDERGROUND AND/OR OVERHEAD ELECTRICAL AND TELEPHONE CABLES, AND POLES ARE NOT WARRANTED TO BE SHOWN.
3. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL PROPERTY LINES, EASEMENTS, EXISTING UTILITIES, AND OTHER EXISTING FEATURES. REPORT FINDINGS TO THE CONTRACT OFFICE OR CONTRACT OFFICE TECHNICAL REPRESENTATIVE (CO/CTO) PRIOR TO CONSTRUCTION. IT IS THE INTENT TO SHOW ALL PROPERTY LINES, EASEMENTS, UTILITIES, AND UNDERGROUND STRUCTURES, HOWEVER, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL EXISTING UTILITIES AND OTHER ITEMS, WHETHER SHOWN ON THESE DRAWINGS OR NOT.
4. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING FEATURES, UTILITIES, AND STRUCTURES, PRIOR TO START OF AND DURING WORK.
5. PRIOR TO THE START OF ANY CONSTRUCTION, THE CONTRACTOR SHALL CONTACT UTILITY OR OTHER OWNERS AND MAKE EXPLORATORY EXCAVATIONS AS NECESSARY, TO VERIFY UNDERGROUND UTILITY LOCATIONS AND THE LIMITS OF AND CHARACTER OF SOIL AND/OR ROCK. THE CONTRACTOR SHALL ALSO DETERMINE THE STATUS OF OPERATIONS OF ALL UTILITIES.
6. IF ANY FEATURE OR UTILITY REQUIRES RELOCATION AND/OR BEING TEMPORARILY OUT OF SERVICE, THE CONTRACTOR SHALL NOTIFY THE OWNER OF THE FEATURE OR UTILITY A MINIMUM OF 72 HOURS IN ADVANCE OF ARRANGEMENTS WITH THE OWNER OF THE FEATURE OR UTILITY FOR TIMELY RELOCATION OF THE FEATURE OR UTILITY. RELOCATION OF MINOR FACILITIES MAY BE DONE BY THE CONTRACTOR IF ACCEPTABLE TO THE CO/CTO AND THE FACILITIES OWNER.



#### SURVEYING NOTES:

1. MAPPING DERIVED FROM A SURVEY PERFORMED BY J.R.S. SURVEYING, INC. 5476 S. MAIN BONNERS FERRY, IDAHO 83805 (208) 287-7555 CDM HAS NOT VERIFIED SURVEY ACCURACY.
2. VERTICAL DATUM FROM HARNIS STATION C506 NOV0 29.

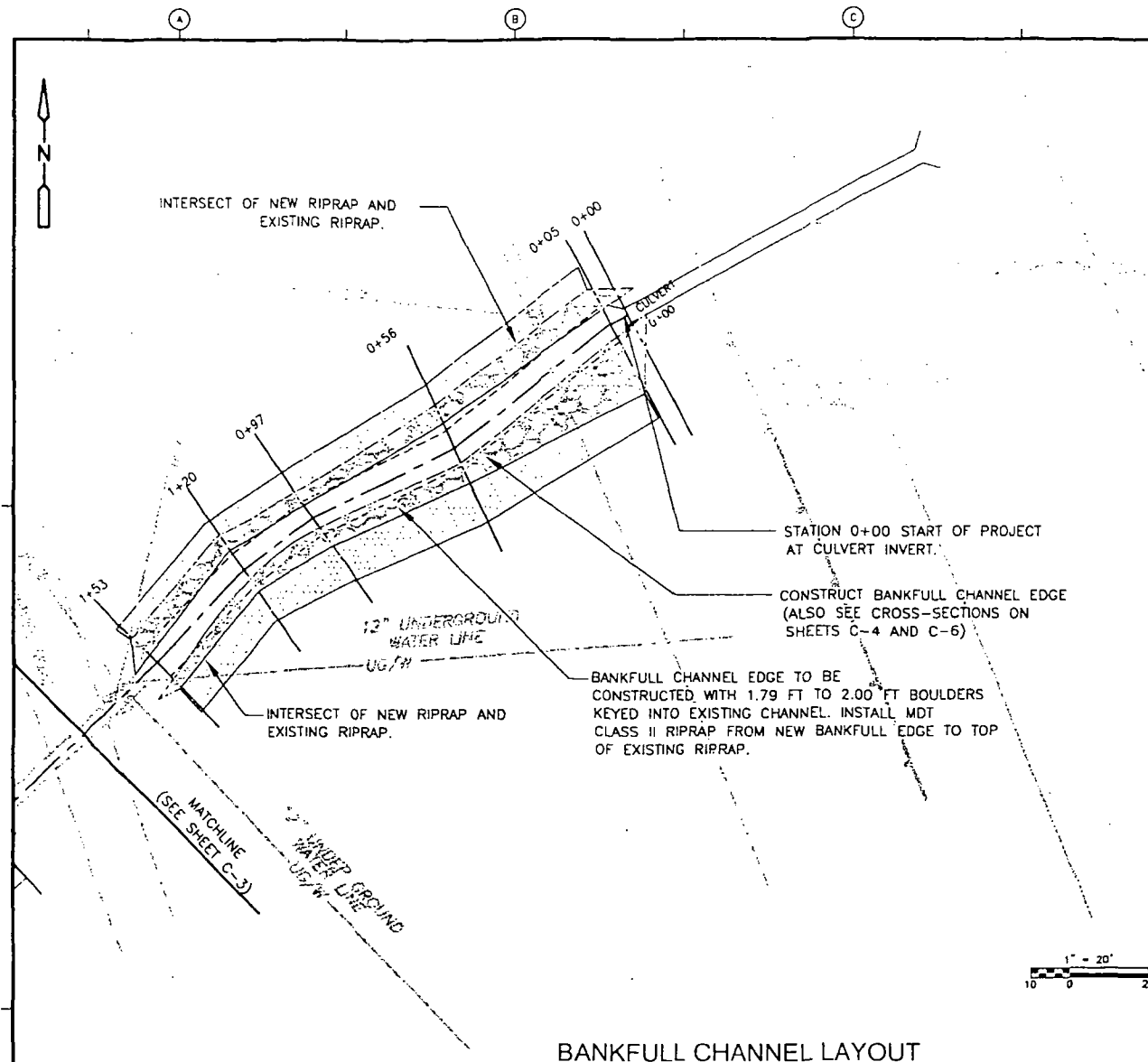
#### GENERAL NOTES:

1. THE RAINY CREEK RESTORATION WORK BEGINS AT THE MONTANA HIGHWAY 37 CULVERT OUTFALL AND ENDS AT THE CONFLUENCE OF RAINY CREEK AND THE KOOTENAI RIVER. INCLUDED IN THE PROPOSED WORK ARE MOBILIZATION, WATER CONTROL, ENVIRONMENTAL PROTECTION, AND INSTALLATION OF STREAM RESTORATION COMPONENTS INCLUDING A BANKFULL CHANNEL, STEP-POOLS, AND J-VANES. THE NORTH AND SOUTH BANKS OF RAINY CREEK IN THIS AREA WILL ALSO BE TOPSOILED AND REVEGETATED PRIOR TO DEMOBILIZATION.
2. THE NORTH KOOTENAI RIVER BANK REVEGETATION WORK BEGINS AT THE EASTERN PARKER PROPERTY LINE AND EXTENDS ALONG THE NORTHERN KOOTENAI RIVER BANK TO THE WESTERN PARKER PROPERTY LINE. INCLUDED IN THIS PROPOSED WORK ARE MOBILIZATION, ENVIRONMENTAL PROTECTION, TOPSOIL PLACEMENT ON THE RIVER BANK, REVEGETATION, AND DEMOBILIZATION.
3. NO MATERIAL OR EQUIPMENT OTHER THAN THAT NEEDED FOR WATER CONTROL IS TO BE STOCKPILED OR STORED IN THE RIVER CHANNEL DURING TIMES WHEN WORK IS NOT IN PROGRESS. ALL MATERIAL AND EQUIPMENT, OTHER THAN THAT NEEDED FOR WATER CONTROL, IS TO BE REMOVED FROM THE RIVER CHANNEL AT THE END OF EACH WORKDAY. COVERMENT OR CO/CTO IS NOT RESPONSIBLE FOR THE COST OF EQUIPMENT OR MATERIAL LOST IN THE RIVER DUE TO HIGH FLOWS OR OTHER CONDITIONS.
4. CONTRACTOR SHOULD BE AWARE THAT THE KOOTENAI RIVER WATER SURFACE FREQUENTLY CHANGES DUE TO NATURAL CAUSES OR FROM OPERATION OF THE LIBBY DAM.
5. RAINY CREEK IS SUBJECT TO INCREASED FLOWS IN RESPONSE TO A COMBINATION OF SNOWMELT RUNOFF, AND/OR STORM EVENTS. CONTRACTOR SHOULD ANTICIPATE DELAYS DURING THESE PERIODS RESULTING FROM LOSS OF WATER CONTROL DUE TO HIGH FLOWS, AND PLAN ACCORDINGLY.
6. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING CONTROL OF RAINY CREEK FLOW AT ALL TIMES DURING THE CONTRACT PERIOD AT THE PROJECT SITES WHILE WORK IS UNDERWAY. CONTRACTOR MUST CONTROL CREEK FLOW IN SUCH A MANNER THAT DOES NOT IMPACT WORK AT THE SITE, DOES NOT RESULT IN LOSS OF MATERIALS INSTALLED OR STORED AT THE SITE, AND DOES NOT IMPACT DOWNSTREAM BANKS, BARS, CHANNELS, WETLANDS, OR THE KOOTENAI RIVER. CONTRACTOR SHOULD ASSUME LOSS OF WATER CONTROL WILL OCCUR SEVERAL TIMES DURING THE EXECUTION OF THE WORK. WHEN THIS HAPPENS, CONTRACTOR WILL RESTORE CONTROL, CLEAN UP RESULTING DEBRIS, REBUILD STRUCTURAL DAMAGE, REPLACE MATERIAL AND/OR TREES, SHRUBS, SEEDS, AND RESTORE ERODED BANKS AT NO ADDITIONAL COST TO GOVERNMENT OR CO/CTO.
7. CONTRACTOR IS TO PROVIDE A WORK PLAN AND SCHEDULE THAT OUTLINES THE PROPOSED CONSTRUCTION METHODS, INCLUDING CONTROL OF RAINY CREEK FLOWS DURING STREAM RESTORATION.
8. FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED AND INSTALL, FIELD TEST, AND OPERATE TEMPORARY BY-PASS PUMPING SYSTEM FOR RAINY CREEK FOR THE PURPOSE OF DIVERTING FLOW AROUND WORK AREAS.
9. THE WORK SEQUENCE IS CONTRACTOR'S RESPONSIBILITY. THE RECOMMENDED SEQUENCE IS:
  - A. INSTALL EROSION AND SEDIMENT CONTROL STRUCTURES.
  - B. DIVERT WATER AROUND STREAM SECTION TO BE WORKED.
  - C. INSTALL PROPOSED STREAM CHANNEL IMPROVEMENTS.
  - D. RETURN STREAM FLOW TO RESTORED CHANNEL AND DIVERT WATER AROUND NEXT SECTION(S) TO BE WORKED; AND,
  - E. TOPSOIL AND REVEGETATE STREAM BANKS.
10. SITE ACCESS AND EQUIPMENT STAGING AREAS TO BE APPROVED BY CO/CTO PRIOR TO COMMENCEMENT OF WORK.
11. PREVIOUS SITE WORK AND REVEGETATION MUST BE PROTECTED. CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL AREAS DISTURBED BY THIS WORK.

PRELIMINARY FOR REVIEW ONLY

DESIGNED BY: DMS					U.S. DEPARTMENT OF TRANSPORTATION RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION JOHN A. JOHNSON NATIONAL TRANSPORTATION SYSTEMS CENTER 53 BROADWAY, FLOOR 10, NEW YORK, NY 10004 CAMBRIDGE, MASSACHUSETTS 02142	CONTRACTOR SUPPORT PROVIDED BY:  Federal Programs Corporation 34 W. WEST CHURCH CIRCLE SUITE 104 MELDEN, MONTANA 59601	ASBESTOS REMOVAL PROJECT LIBBY, MONTANA  SCREENING PLANT	RAINY CREEK EXISTING CONDITIONS PLAN	PROJECT NO. 4006
DRAWN BY: J.M.									FILE NAME. 35767-C1
SHEET CHECKED BY: G.P.									SHEET NO.
CROSS CHECKED BY: T.J.									C-1
REV. NO.	DATE	DRWN	CHKD	REMARKS	APPROVED BY: P.J.B.	DATE: JUNE 2002			

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BANKFULL CHANNEL LAYOUT

- EDGE OF GRAVEL ROADS / HWY R.O.W.  
RIVERS EDGE  
GUARDRAIL  
UG/W UNDERGROUND 12" WATER  
UG/E UNDERGROUND ELECTRICAL  
W UNDERGROUND WATER  
UTILITY POLE  
EXISTING RIPRAP  
EXISTING GEO-FABRIC  
PROPOSED BANKFULL CHANNEL



ENVIRONMENTAL PROTECTION PROCEDURES:

1. FURNISH ALL LABOR, MATERIALS, AND EQUIPMENT, AND PERFORM ALL WORK REQUIRED FOR THE PREVENTION OF ENVIRONMENTAL POLLUTION IN CONFORMANCE WITH ALL APPLICABLE LAWS AND REGULATIONS. DURING CONSTRUCTION OPERATIONS, ENVIRONMENTAL POLLUTION IS DEFINED AS THE PRESENCE OF CHEMICAL, PHYSICAL, OR BIOLOGICAL ELEMENTS OR AGENTS, WHICH ADVERSELY AFFECT HUMAN HEALTH OR WELFARE; UNFAVORABLY ALTER ECOLOGICAL BALANCES; AFFECT OTHER SPECIES; OR DEGRADE THE UTILITY OF THE ENVIRONMENT FOR AESTHETIC AND/OR RECREATIONAL PURPOSES.
2. SCHEDULE AND CONDUCT ALL WORK IN A MANNER THAT WILL MINIMIZE THE EROSION OF SOILS AND ENTRAINMENT OF SILT-LADEN RUNOFF INTO RIVER FLOW IN THE AREA OF THE WORK. PROVIDE EROSION CONTROL MEASURES SUCH AS DIVERSION CHANNELS, SEDIMENTATION, OR FILTRATION SYSTEMS, BERMS, STAKED HAY BALES, SEEDING, MULCHING, OR OTHER SPECIAL SURFACE TREATMENTS AS ARE REQUIRED TO PREVENT SILTING AND MUDDYING OF STREAMS, RIVERS, IMPOUNDMENTS, LAKES, ETC. THE CONTRACTOR MUST SUBMIT AN EROSION AND SEDIMENT CONTROL PLAN TO THE CONTRACTING OFFICER/CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (CO/COTR) PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE IN AN AREA PRIOR TO ANY CONSTRUCTION ACTIVITY IN THAT AREA.
3. PREVENT ANY DAMAGE TO RAINY CREEK OR THE KOOTENAI RIVER FROM POLLUTION BY DEBRIS, SEDIMENT, OR OTHER MATERIAL, OR FROM THE MANIPULATION OF EQUIPMENT AND/OR MATERIALS IN OR NEAR SUCH RIVERS. WATER THAT HAS BEEN USED FOR WASHING OR PROCESSING, OR THAT CONTAINS OILS OR SEDIMENTS THAT WILL REDUCE THE QUALITY OF THE WATER IN THE RIVER, SHALL NOT BE DIRECTLY RETURNED TO THE RIVER. SUCH WATERS WILL BE DIVERTED THROUGH A SETTLING BASIN AND/OR FILTER BEFORE BEING DIRECTED INTO THE RIVER.
4. DUST CONTROL. THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN ALL EXCAVATIONS, EMBANKMENTS, STOCKPILES, ACCESS ROADS, PLANT SITES, WASTE AREAS, BORROW AREAS, AND ALL OTHER WORK AREAS FREE FROM DUST, THAT EXCEEDS AIR QUALITY STANDARDS OR THAT CAUSES A HAZARD OR NUISANCE TO OTHERS.

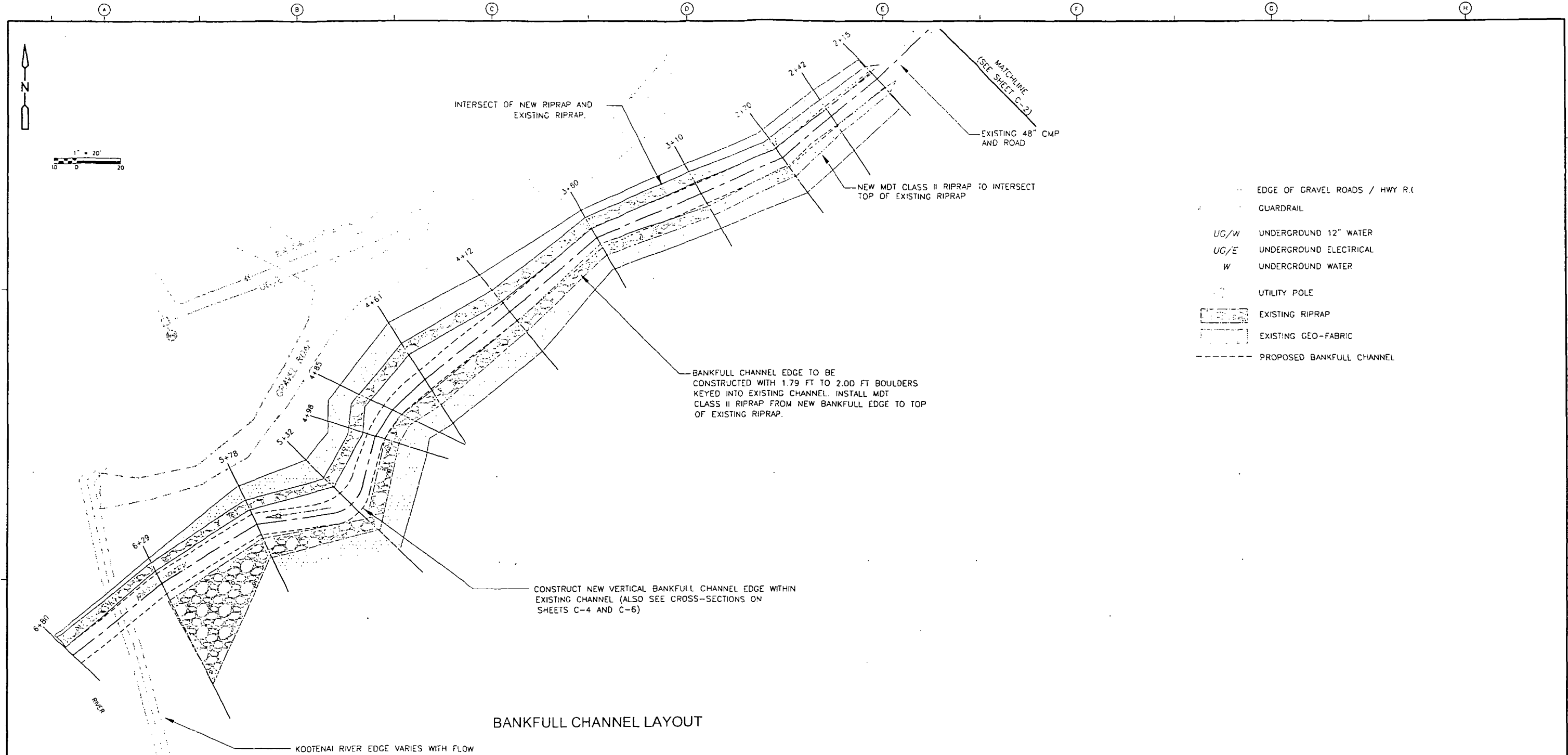
RAINY CREEK WATER DIVERSION

1. ONSITE MATERIALS MAY NOT BE EXCAVATED FOR USE AS DIVERSION CHANNELS. PUMPS AND ASSOCIATED PIPING ARE TO BE USED WITHIN THE LIMITS OF CONSTRUCTION TO DIVERT RAINY CREEK WATER AROUND ACTIVE CONSTRUCTION AREAS. OTHER MATERIALS SUCH AS PLASTIC SHEETING OR SAND BAGS MAY BE USED AS NEEDED TO ACHIEVE APPROPRIATE CONTROL. CONTRACTOR MAY BE REQUIRED BY CO/COTR, AT NO ADDITIONAL COST TO THE GOVERNMENT, TO PROVIDE ADDITIONAL CONTROL, IF IN THE OPINION OF THE CO/COTR EXISTING CONTROL APPEARS INADEQUATE OR IS NOT IN CONFORMANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN.
2. FOR ALL RAINY CREEK RESTORATION WORK, THE CONTRACTOR SHALL PROVIDE SUITABLE EQUIPMENT AND LABOR TO MAINTAIN THE WORK AREA IN A DRY CONDITION, AND KEEP THE STREAM DEWATERED SO THAT RIPRAP, BOULDER PLACEMENT AND GROUTING WORK CAN BE CARRIED ON UNDER DRY CONDITIONS. WATER CONTROL SHALL BE ACCOMPLISHED IN SUCH A WAY THAT NO DAMAGE IS DONE TO THE ADJACENT BANKS OR TO THE KOOTENAI RIVER.
3. MAINTAIN TEMPORARY BY-PASS PUMPING SYSTEMS SO THAT THEY ARE COMPLETELY FUNCTIONAL THROUGHOUT THE REQUIRED PERIOD OF SERVICE. FOLLOWING THE REQUIRED PERIOD OF SERVICE, REMOVE TEMPORARY BY-PASS PUMPING SYSTEMS FROM SITE.
4. PROVIDE ALL MAINTENANCE INCLUDING MANUFACTURER RECOMMENDED PREVENTIVE MAINTENANCE AND ON-CALL REPAIR SERVICES. CONTRACTOR SHALL PROVIDE REPAIR SERVICES AND/OR REPLACEMENT EQUIPMENT 24 HOURS PER DAY, SEVEN DAYS PER WEEK WITHIN 4 HOURS OF BEING CALLED.
5. THE FOLLOWING PEAK FLOWS HAVE BEEN PREDICTED FOR RAINY CREEK:
  - Q2 = 119 CFS
  - Q5 = 187 CFS
  - Q10 = 246 CFS
  - Q25 = 303 CFS
  - Q50 = 360 CFS
  - Q100 = 404 CFS

PRELIMINARY FOR REVIEW ONLY

DESIGNED BY: D.W.S.		U.S. DEPARTMENT OF TRANSPORTATION RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION JOHN A. VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER TRANSPORTATION ENGINEERING DIVISION (DTES-33) 130 BROADWAY, BOSTON, MASSACHUSETTS 02112		CONTRACTOR SUPPORT PROVIDED BY: Federal Programs Corporation 341 E. LAST CHANCE CIRCLE SUITE 100 HELENA, MONTANA 59601	ASBESTOS REMOVAL PROJECT LIBBY, MONTANA  SCREENING PLANT	PROJECT NO. 4000 FILE NAME. 35767-C2  SHEET NO. C-2
DRAWN BY: J.K.						
SHEET CHECKED BY: G.P.						
CROSS CHECKED BY: T.J.						
APPROVED BY: D.J.B.						
DATE: JUNE 2002						
REV. NO.	DATE	DRWN	CHKD	REMARKS		



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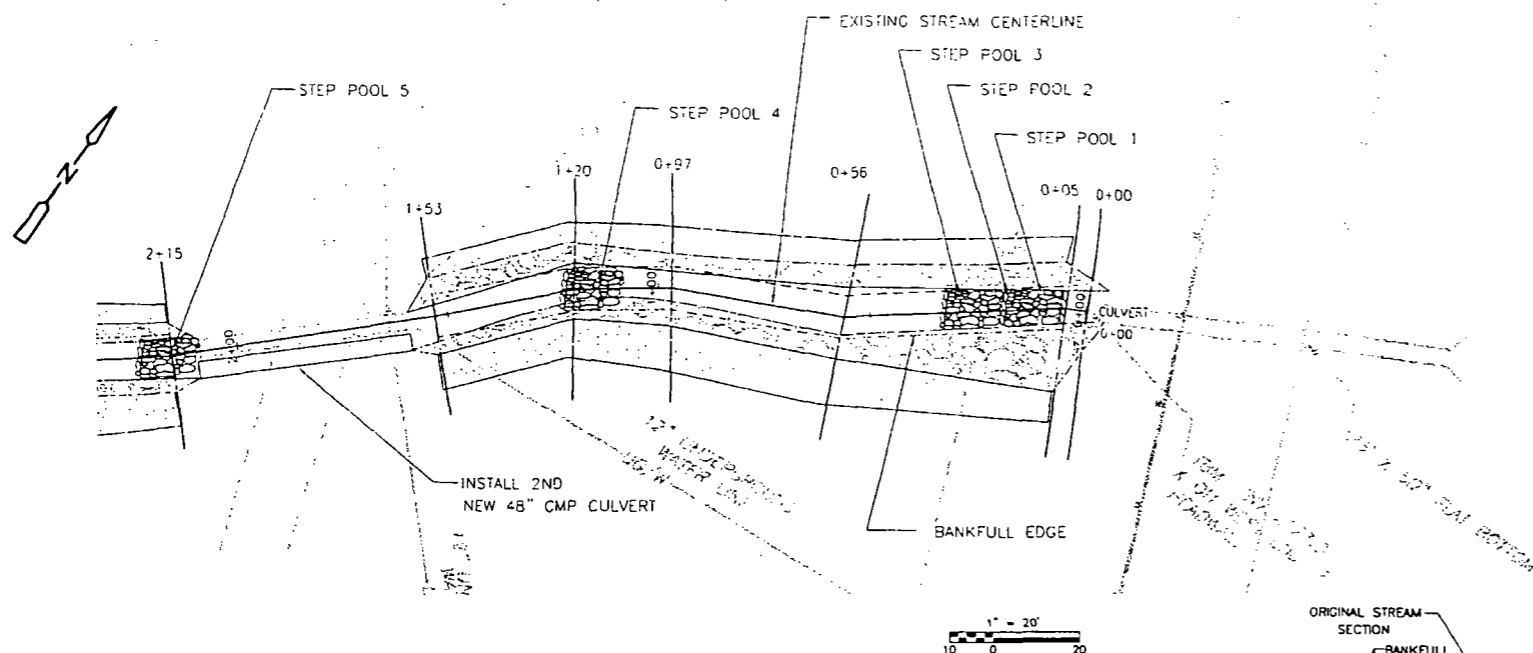
- EDGE OF GRAVEL ROADS / HWY R.C.
- GUARDRAIL
- UG/W UNDERGROUND 12" WATER
- UG/E UNDERGROUND ELECTRICAL
- W UNDERGROUND WATER
- UTILITY POLE
- [Pattern] EXISTING RIPRAP
- [Pattern] EXISTING GEO-FABRIC
- PROPOSED BANKFULL CHANNEL

BANKFULL CHANNEL LAYOUT

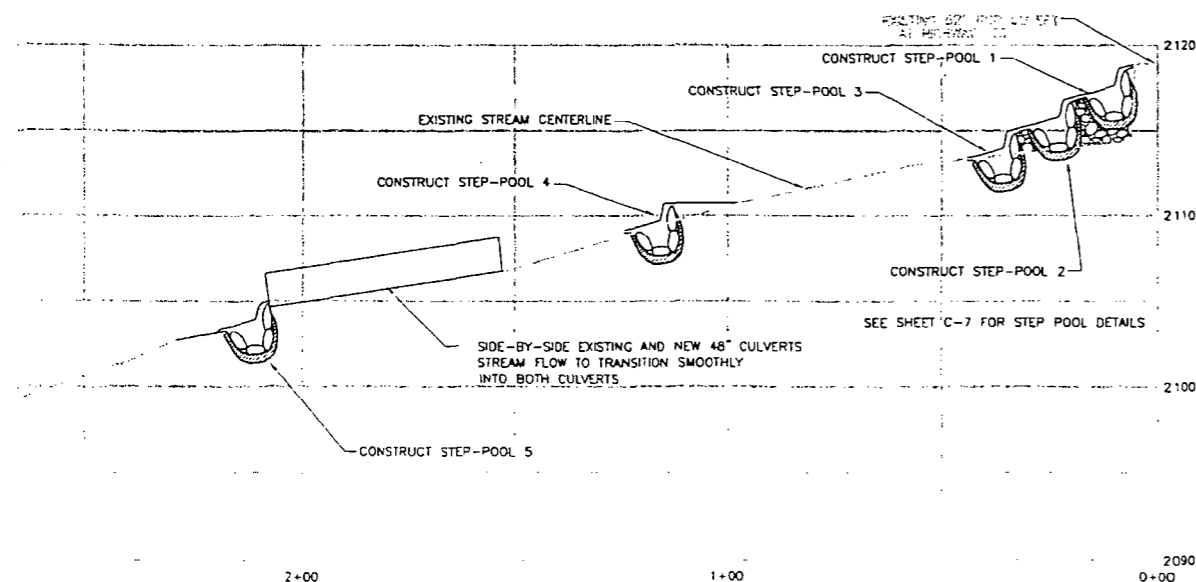
PRELIMINARY FOR REVIEW ONLY

<table border="1"><thead><tr><th>REV. NO.</th><th>DATE</th><th>DRWN</th><th>CHKD</th><th>REMARKS</th></tr></thead><tbody><tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr></tbody></table>				REV. NO.	DATE	DRWN	CHKD	REMARKS																<table border="1"><tr><td>DESIGNED BY: D.M.S.</td></tr><tr><td>DRAWN BY: J.K.</td></tr><tr><td>CHECKED BY: G.P.</td></tr><tr><td>APPROVED BY: T.J.</td></tr><tr><td>DATE: JUNE 2002</td></tr></table>		DESIGNED BY: D.M.S.	DRAWN BY: J.K.	CHECKED BY: G.P.	APPROVED BY: T.J.	DATE: JUNE 2002	 <p>U.S. DEPARTMENT OF TRANSPORTATION RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION JOHN A. VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER 400 BRIDGE PLAZA, FORT BELLEVILLE, ILLINOIS 62209-4201 CAMBRIDGE, MASSACHUSETTS 02142</p>		<p>CONTRACTOR SUPPORT PROVIDED BY:</p>  <p>Federal Programs Corporation 24 N. EAST CHANCE GULCH SUITE 104 HELENA, MONTANA 59601</p>		<p>ASBESTOS REMOVAL PROJECT LIBBY, MONTANA</p> <p>SCREENING PLANT</p>		<p>RAINY CREEK NEW BANKFULL CHANNEL LAYOUT</p>		<table border="1"><tr><td>PROJECT NO. 4000</td></tr><tr><td>FILE NAME. 35767-C3</td></tr><tr><td>SHEET NO. C-3</td></tr></table>		PROJECT NO. 4000	FILE NAME. 35767-C3	SHEET NO. C-3
REV. NO.	DATE	DRWN	CHKD	REMARKS																																							
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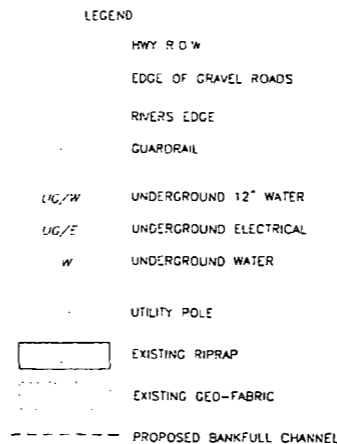
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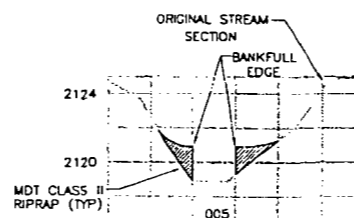
RAINY CREEK RESTORATION PLAN  
SCALE 1"=20'



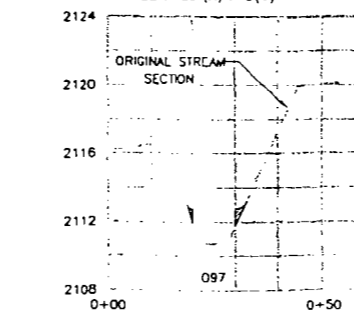
CENTERLINE PROFILE  
SCALE 1"=20' (H) 1"=5' (V)



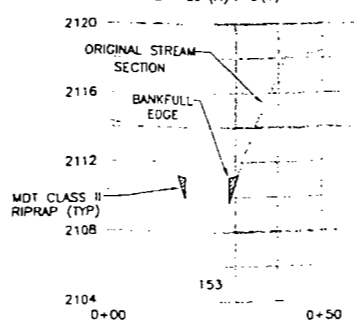
- NOTES
1. LOCATE STEP-POOLS AND J-VANE STRUCTURES AS INDICATED ON THE DRAWINGS. HOWEVER, THE CO/CDTR RESERVES THE RIGHT TO MAKE SUCH MODIFICATIONS IN LOCATIONS AS MAY BE FOUND DESIRABLE TO AVOID INTERFERENCE WITH EXISTING STRUCTURES OR FOR OTHER REASONS.
  2. STEP-POOLS TO BE CONSTRUCTED FROM GROUTED MDT CLASS II RIPRAP. MINIMUM THICKNESS BENEATH POOLS = 1.5 FEET.
  3. BOULDERS FOR CREATING THE SLOPING BOULDER FACE IN THE STEP-POOLS (SEE SHEET C-7). J-VANES AND FOR CREATING THE RAINY CREEK BANKFULL CHANNEL EDGE SHALL BE 1.79 FEET TO 2.00 FEET IN DIAMETER AT A MINIMUM.
  4. THE BANKFULL CHANNEL RIPRAP LOCATED DIRECTLY ABOVE STEP-POOLS SHALL ALSO BE GROUTED AS DETAILED ON SHEET C-7.
  5. THE CONTRACTOR SHALL MANAGE THE DELIVERY AND STOCKPILING OF ROCK AT THE SITE TO ASSURE THAT AN ADEQUATE SUPPLY OF ROCK MEETING THE SPECIFICATION IS AVAILABLE FOR INSTALLATION WHEN REQUIRED. STOCKPILE LOCATIONS SHALL BE ARRANGED TO AVOID INTERFERENCE WITH OTHER PROJECT OPERATIONS. GROUTED ROCK WILL BE STOCKPILED AND HANDLED SUCH THAT IT WILL BE KEPT CLEAN OF DIRT AND OTHER OBJECTIONABLE MATERIAL. IN-PLACE RIPRAP MUST BE CLEAN OF ALL DIRT BEFORE GROUTING. ROCK THAT DOES NOT MEET THE SPECIFICATIONS OR IS NOT INSTALLED SHALL BE REMOVED FROM THE SITE.
  6. EXCAVATE FOR PLACEMENT OF STEP-POOLS. MATERIAL PROJECTING ABOVE THE SPECIFIED GRADE MUST BE REMOVED. ALL SOFT SOILS, ORGANIC MATERIAL, AND DEBRIS MUST BE REMOVED AND A FIRM FOUNDATION PROVIDED. BACKFILL OVER-EXCAVATIONS WITH NATIVE MATERIAL AS DIRECTED BY THE CO/CDTR AND COMPACT. OVER EXCAVATION AND REPLACEMENT MATERIAL WITH APPROVED ONSITE MATERIAL UP TO 1-FT THICKNESS WILL BE CONSIDERED PART OF THE WORK.
  7. PLACE MDT CLASS II RIPRAP AS INDICATED ON THE DRAWINGS TO CREATE THE BANKFULL CHANNEL. MACHINE-PLACE STONES INTO POSITION AFTER PLACEMENT OF 1.79 FEET TO 2.00 FOOT BOULDERS AT THE BANKFULL EDGE. ARRANGE AS NECESSARY BY USE OF GRADALL OR MULTIPURPOSE GRAPPLE DEVICE OR HAND TO INTERLOCK AND FORM A SUBSTANTIAL MECHANICAL FRICTION JOINT. DUMPING AND/OR BACKHOE PLACEMENT ALONE IS NOT SUFFICIENT TO ENSURE PROPER INTERLOCKED PLACEMENT. SURFACE GRADES WILL BE A PLANE OR AS INDICATED, BUT PROJECTIONS ABOVE OR DEPRESSIONS UNDER THE AVERAGE SURFACE PLANE MORE THAN 20 PERCENT OF THE INDICATED ROCK LAYER THICKNESS WILL NOT BE ALLOWED. THE AVERAGE SURFACE PLANE IS DEFINED AS THE PLANE WHERE 50 PERCENT OF THE TOPS OR ROCKS WOULD CONTACT. IT IS ESSENTIAL THAT THE MATERIAL BETWEEN STONES NOT BE LOOSE OR EASILY DISPLACED BY FLOW. THE STREAMSIDE OF THE RIPRAP IS TO BE UNIFORM AND FREE FROM BULGES, HUMPS, OR CAVITIES. ANY SMALLER MATERIALS MUST BE LOCKED IN PLACE BY THE D50 OR LARGER ROCK. ALL ROCK IS TO BE PLACED IN A DEWATERED CONDITION BEGINNING AT THE BANKFULL CHANNEL OF THE SLOPE.
  8. ALL RIPRAP PLACED ABOVE THE BANKFULL EDGE OF RAINY CREEK SHALL BE COVERED WITH TOPSOIL AS SHOWN IN SHEET C-9. THIS MATERIAL SHALL BE WASHED INTO THE VOID AREAS BETWEEN THE ROCKS IN SUCH A WAY THAT ALL VOIDS ARE WELL PACKED TO THE FULL DEPTH OF RIPRAP. THE INTENT IS TO HAVE SOME OF THE LARGER ROCK VISIBLE WITH TIGHTLY FILLED VOIDS OF TOPSOIL AND SMALLER ROCK, AND TO FORCE THE PLANTS TO GROW INTO THE RIPRAP. THE FINAL SURFACE WILL BE THOROUGHLY WETTED FOR GOOD COMPACTION, SMOOTHED AND COMPACTED BY VIBRATING EQUIPMENT. THE SURFACE WILL BE HAND RAKED TO RECEIVE PLANTING OR SEEDING. THE SOIL MATRIX SHOULD NOT BE PERCHED, THAT IS GROUNDWATER SHOULD BE ABLE TO DRAIN WHEN MOIST AND SOILS IRRIGATED FROM LOW FLOW WATER IN DRY PERIODS.
  9. THE CONTRACTOR WILL COORDINATE THE WORK WITH THE LANDSCAPING PLAN SHOWN ON SHEET C-9, PROVIDING A TREE AND SHRUB SWALE AND OTHER DETAILS SUCH THAT PLANTING AND LANDSCAPING CAN BE ACCOMPLISHED.
  10. UNGROUTED BOULDERS THAT MAKE UP THE RAINY CREEK BANKFULL CHANNEL ARE TO BE PLACED IN A SPECIFIC POSITION TO CREATE A VERTICAL FACE AND SECURELY CHINKED WITH RIPRAP TO PREVENT ROLLING INTO THE CREEK. THE CONTRACTOR WILL BE RESPONSIBLE FOR REPLACING BOULDERS THAT BECOME LOOSE DURING THE CONSTRUCTION.
  11. WHEN PLACED, BOULDERS MAKING UP THE RAINY CREEK BANKFULL CHANNEL SHALL HAVE A 3-IN MAXIMUM VARIATION IN THE ELEVATION OF THE TOP OF THE BOULDERS. BOULDERS NOT MEETING THIS REQUIREMENT SHALL BE REPLACED AT CONTRACTOR'S EXPENSE.



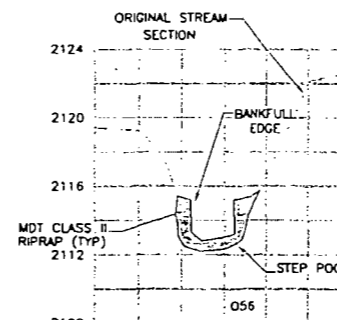
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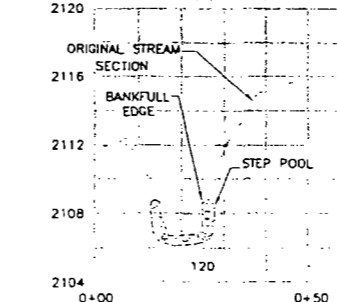
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SECTION 1+53  
SCALE 1"=20' (H) 1"=5' (V)



SECTION 0+56  
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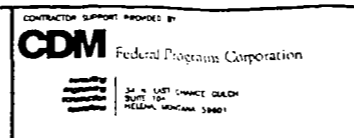
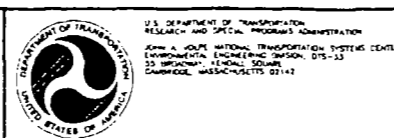


SECTION 1+20  
SCALE 1"=20' (H) 1"=5' (V)

PRELIMINARY FOR REVIEW ONLY

REV	NO	DATE	DRWN	CHKD	REMARKS

DESIGNED BY	D.M.S.
DRAWN BY	J.K.
SHEET CHECKED BY	G.P.
CROSS CHECKED BY	T.J.
APPROVED BY	D.J.B.
DATE	JUNE 2002

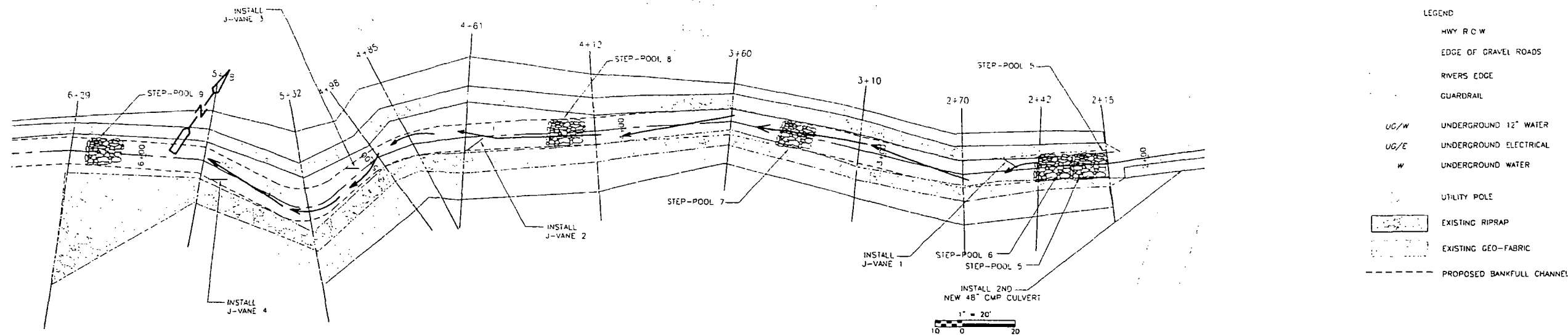


ASBESTOS REMOVAL PROJECT  
LIBBY, MONTANA  
  
SCREENING PLANT

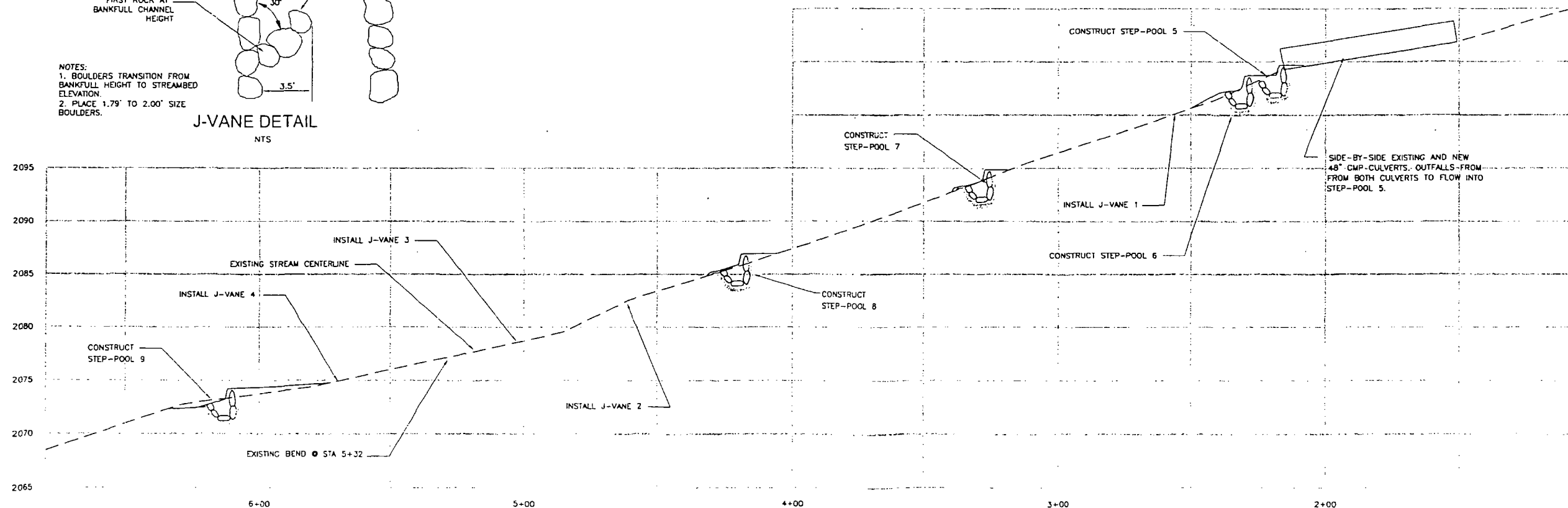
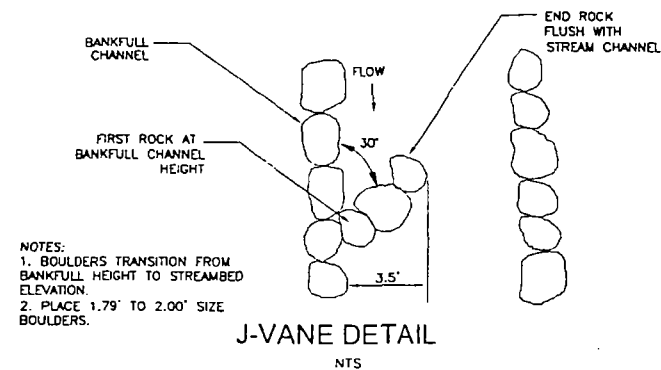
RAINY CREEK PLAN AND PROFILE  
  
C-4

PROJECT NO.	4000
FILE NAME	35767-C4
SHEET NO.	C-4

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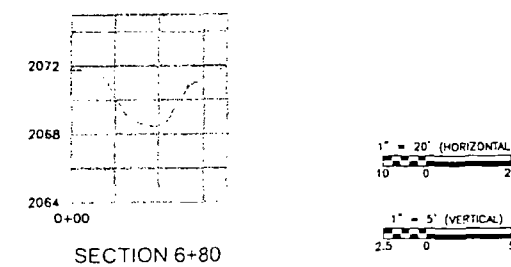
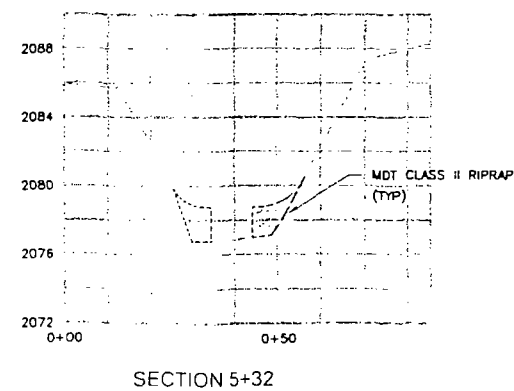
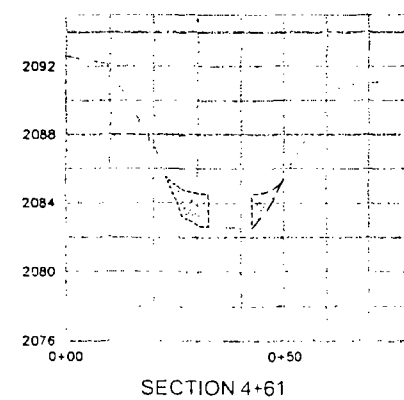
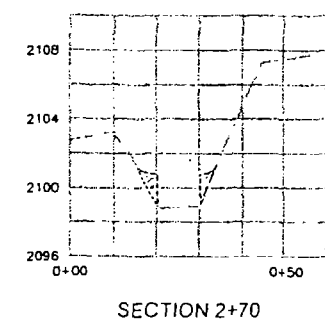
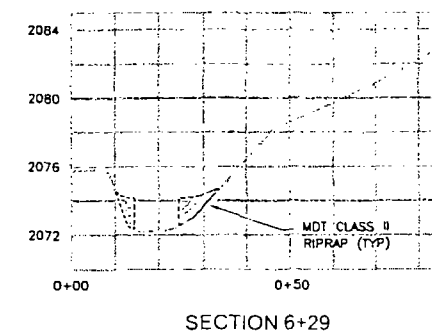
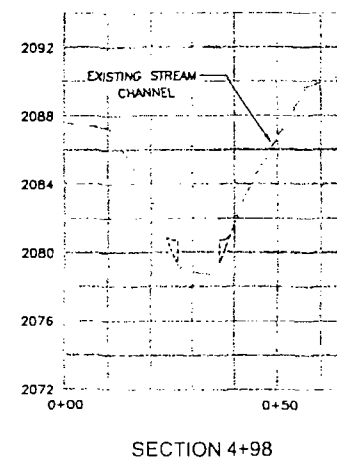
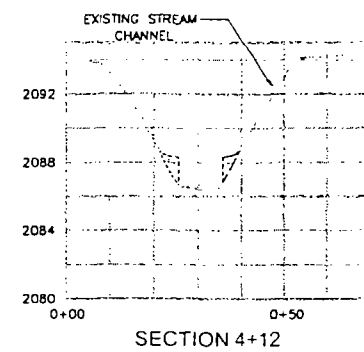
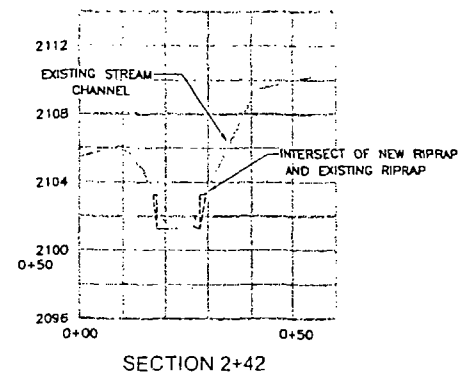
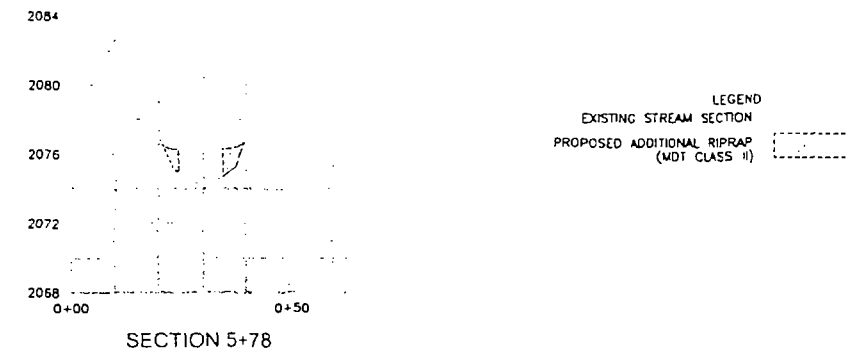
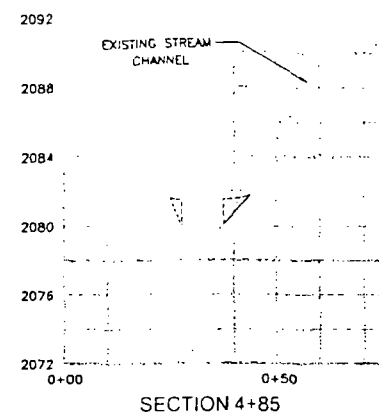
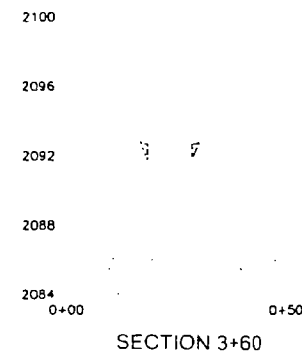
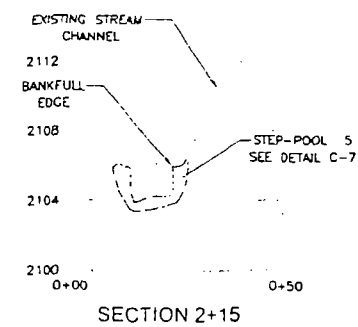


RAINY CREEK RESTORATION PLAN  
SCALE 1"=20'






PRELIMINARY FOR REVIEW ONLY

DESIGNED BY: D.M.S. DRAWN BY: J.K. CHECKED BY: G.P. CROSS CHECKED BY: T.J. APPROVED BY: P.J.B. DATE: JUNE 2002				U.S. DEPARTMENT OF TRANSPORTATION RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION JOHN A. JOHNSON NATIONAL TRANSPORTATION SYSTEMS CENTER 1215 UNIVERSITY DRIVE, SUITE 200 CAMBRIDGE, MASSACHUSETTS 02142		CONTRACTOR SUPPORT PROVIDED BY: <b>CDM</b> Federal Programs Corporation ONE CAMBRIDGE PLACE 50 WASHINGTON STREET CAMBRIDGE, MASSACHUSETTS 02139		ASBESTOS REMOVAL PROJECT LIBBY, MONTANA  SCREENING PLANT		RAINY CREEK PLAN AND PROFILE		PROJECT NO. 4000 FILE NAME: 35767-C5 SHEET NO. C-5
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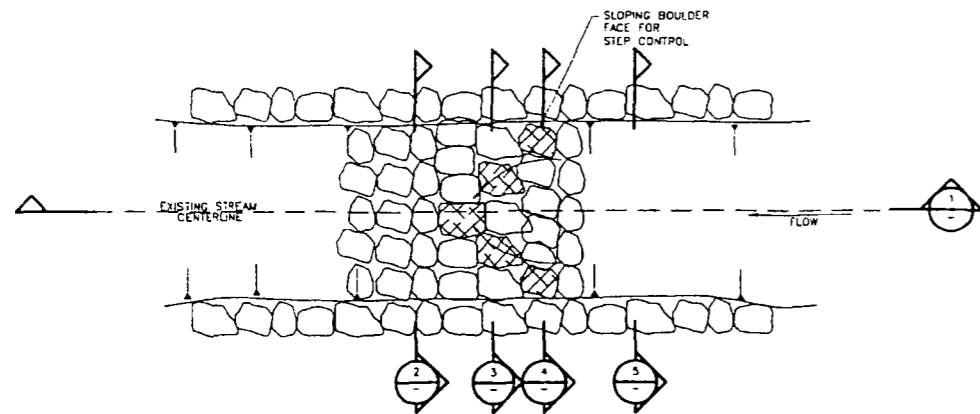


NOTE:  
CROSS SECTIONS LOCATED LOOKING  
UPSTREAM.

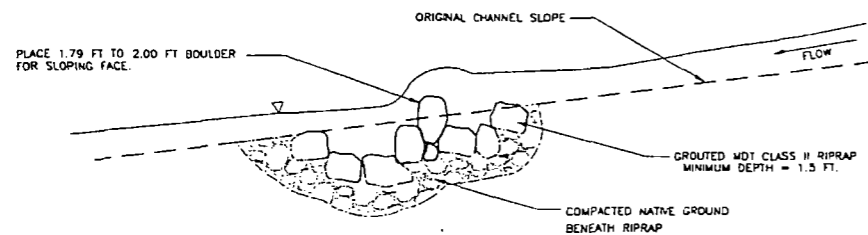
PRELIMINARY FOR REVIEW ONLY

					DESIGNED BY: D.M.S.	 <p>U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AID SPECIAL PROGRAMS ADMINISTRATION JOHN A. VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER CONVENT DRIVE, CHAMBERSBURG, OHIO 43001-33 31 BROADWAY, LITTLE ROCK, ARKANSAS CAMBRIDGE, MASSACHUSETTS 02142</p>	 <p>CONTRACTOR SUPPORT PROVIDED BY: Federal Programs Corporation</p>  <p>IN-TO LAST CHANCE SUITE 104 HELLENA, MONTANA 59801</p>	ASBESTOS REMOVAL PROJECT LIBBY, MONTANA	RAINY CREEK SECTIONS	PROJECT NO. 4000
					FILE NAME: 35767-C6					
					SHEET NO.					
					C-6					
REV. NO.	DATE	DRWN	CHKD	REMARKS	APPROVED BY: P.J.B.					
					DATE: JUNE 2002					

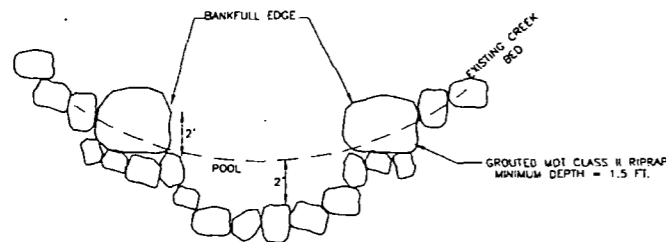
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SINGLE STEP-POOL  
1" = 5'

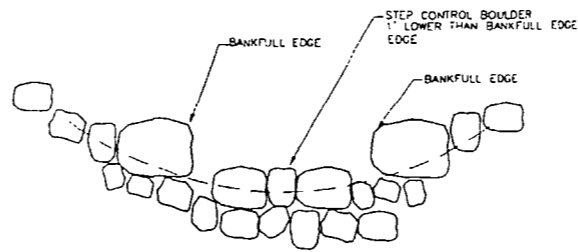


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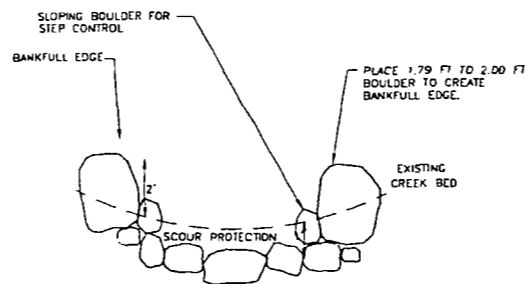


NOTE: POOL TO BE 2 FEET BELOW EXISTING STREAM

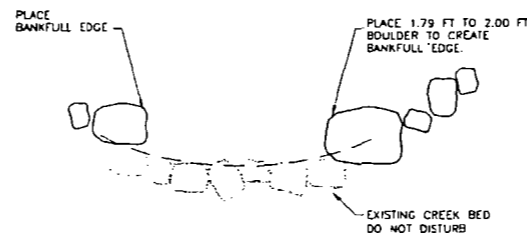
SECTION 2  
1" = 5'



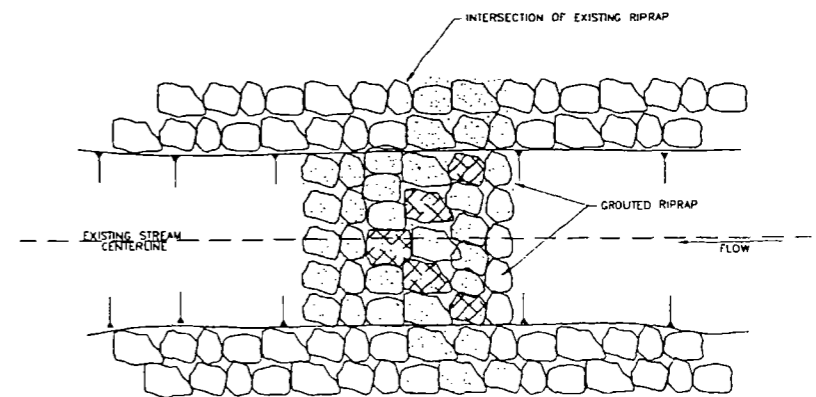
SECTION 3  
1" = 5'



SECTION 4  
1" = 5'



SECTION 5  
1" = 5'



GRouted RIPRAP AREA  
1" = 5'

- GROUTED RIPRAP**
1. GROUT SHALL BE COMPOSED OF TYPE II PORTLAND CEMENT, WATER, FINE AGGREGATE, ENTRAINMENT AIR, AND SYNTHETIC REINFORCING FIBERS. PROPORTIONS SHALL COMPLY WITH THE FOLLOWING MAXIMUMS AND MINIMUMS.
- MINIMUM COMPRESSIVE STRENGTH (ASTM C31 AND C39) - 2,000 PSI AT 28 DAYS  
MINIMUM ALLOWABLE PORTLAND CEMENT/CT - 5 SACKS  
SAND/AGGREGATE COMPOSITION - 70% SAND, 30% 3/8-IN GRAVEL  
AIR ENTRAINMENT - 6-7%  
WATER/CEMENT RATIO - 0.40  
SLUMP - 6-8 IN  
SYNTHETIC REINFORCING FIBER COMPOSITION - 1.5 LB/CY
2. SYNTHETIC REINFORCING FIBERS FOR CONCRETE SHALL BE 100 PERCENT POLYPROPYLENE COLLATED, FIBRILLATED FIBERS AS MANUFACTURED BY FIBERMESH, INC., CHATTANOOGA, TENNESSEE 37416 OR EQUAL. FIBER LENGTH AND QUANTITY ADDED TO THE CONCRETE MIX SHALL BE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AS APPROVED BY THE CO/OTR.
3. COLOR WILL BE SELECTED BASED ON ROCK COLOR. TEST SAMPLES SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BY THE CO/OTR. ADD 0.5 TO 1 PERCENT COLOR ADJUTANT TO CAMOUFLAGE GROUT TO BLEND WITH ROCK WHERE GROUT MAY BE VISIBLE AND AS DIRECTED BY THE CO/OTR. A CURING COMPOUND SHALL BE USED THAT DRIES CLEAR.
4. PRIOR TO PLACING SLOPING BOULDER FACES IN STEP-POOLS, COMPACT THE SUBGRADE. ANY SOFT YIELDING MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED ONSITE MATERIAL AND COMPACTED. NO BOULDERS SHALL BE PLACED UNTIL THE CO/OTR HAS VERIFIED COMPACTION AND SUBGRADE ELEVATIONS.
5. INDIVIDUALLY PLACE SLOPING BOULDER FACES AS INDICATED ON THE DRAWINGS AND DIRECTED IN THE FIELD BY THE CO/OTR. PLACE TIGHTLY TOGETHER TO FORM A DENSE MASS WITH A MINIMUM OF VOIDS. BED BOULDERS WITHIN THE WOT CLASS II RIPRAP. BOULDERS SHALL BE PLACED WITH VERTICALLY FLAT FACES TOWARD THE WATER EDGE AND HORIZONTALLY FLAT FACES UPWARD TO PROVIDE A SMOOTH-WALLED APPEARANCE.
6. WASH THE ROCK FREE OF FINES OR SOIL THAT WOULD AFFECT THE GROUT BOND. ALL BOULDER PLACEMENTS SHALL BE APPROVED BY THE CO/OTR AT LEAST 24-HOURS IN ADVANCE OF SCHEDULED GROUTING TO AVOID UNNECESSARY DELAYS.
7. THE GROUT SHALL BE PLACED BY INJECTION METHODS, PUMPING UNDER LOW PRESSURE (<10 PSI) THROUGH A 2-IN MAXIMUM DIAMETER HOSE TO ENSURE FULL DEPTH PENETRATION OF THE GROUT INTO THE ROCK LAYER. THE VOIDS AT THE SURFACE WILL NOT BE GROUTED.
8. ROCK SHALL PROTRUDE AT LEAST 6-IN OR THE TOP QUARTER OF THE ROCK LAYER, WHICHEVER IS GREATER, ABOVE GROUT. THE VISUAL SURFACES OF THE ROCK WILL BE FREE OF GROUT TO PROVIDE A CLEAN NATURAL APPEARANCE. A "PENCIL" VIBRATOR WILL BE USED TO MAKE SURE ALL VOIDS ARE FULL. THE INTENT IS TO FILL ALL VOIDS FROM THE SUBGRADE LEVEL THROUGH THE ROCK LAYER. IN ALL CASES, GROUT MUST PENETRATE TO SUBGRADE.
9. AFTER PLACEMENT, ALL EXPOSED ROCKS SHALL BE CLEANED WITH A WET BROOM. CLEAN AND WASH ANY SPILLAGE BEFORE GROUT SETS. THE VISUAL SURFACES OF THE ROCK WILL BE FREE OF GROUT TO PROVIDE A CLEAN, NATURAL APPEARANCE.
10. ALL EXPOSED GROUT SHALL BE FINISHED WITH A BROOM FINISH. ALL GROUT SHALL BE SPRAYED WITH A CLEAR LIQUID MEMBRANE CURING COMPOUND AS SPECIFIED IN ASTM C309.
11. HOT WEATHER PLACEMENT: WHEN DEPOSITING GROUT IN HOT WEATHER, FOLLOW RECOMMENDATIONS OF ACI 308.5. THE TEMPERATURE OF CONCRETE AT TIME OF PLACEMENT SHALL NOT EXCEED 90 DEGREES F. GROUT SHALL BE PROTECTED TO PREVENT RAPID DRYING. FINISHING AND CURING SHALL START AS SOON AS POSSIBLE. WHEN THE AIR TEMPERATURE IS EXPECTED TO EXCEED 90 DEGREES F, THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE CO/OTR OF THE PROCEDURES TO BE USED IN PROTECTING, DEPOSITING, FINISHING, AND CURING THE CONCRETE. THE SPECIFIED WATER REDUCING ADJUTANT MAY BE USED UPON APPROVAL OF THE CO/OTR. THE USE OF CONTINUOUS WETTING OR FOG SPRAYS MAY BE REQUIRED BY THE CO/OTR FOR 24 HOURS AFTER DEPOSITING OR THE WORK MAY BE RESTRICTED TO EVENINGS OR NIGHTS, ESPECIALLY IN TIMES OF LOW HUMIDITY.

PRELIMINARY FOR REVIEW ONLY

REV.	NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J.K.  
DRAWN BY: J.K.  
SHEET CHECKED BY: C.P.  
CROSS CHECKED BY: T.J.  
APPROVED BY: P.J.B.  
DATE: JUNE 2002



U.S. DEPARTMENT OF TRANSPORTATION  
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION  
JOHN A. WOLFE NATIONAL TRANSPORTATION SYSTEMS CENTER  
ENVIRONMENTAL, HEALTH AND SAFETY DIVISION, 370-33  
55 BROADWAY, NEW YORK, NEW YORK 10006-0001

CONTRACTOR SUPPORT PROVIDED BY:  
**CDM** Federal Programs Corporation  
34 N. LAST CHANCE BLVD.  
SUITE 100  
KELSO, MONTANA 59001

ASBESTOS REMOVAL PROJECT  
LIBBY, MONTANA  
**SCREENING PLANT**

STEP-POOL DETAILS

PROJECT NO. 4000  
FILE NAME: 35767-C6  
SHEET NO.  
**C-7**



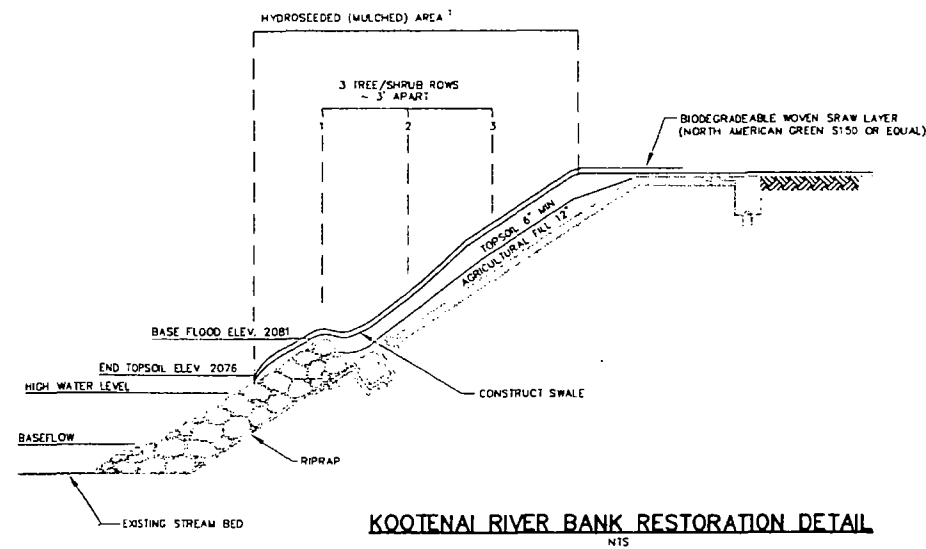
BOTANICAL NAME	COMMON NAME	NUMBER OF PLANTS/ROW (%)			
		ROW 1	ROW 2	ROW 3	TOTAL
<i>Salix exigua</i>	SANDBAR WILLOW	280 (100%)			280
<i>Rosa nutkana</i>	NOTKA ROSE	60 (55%)	50 (45%)		110
<i>Rubus pariflorus</i>	THIMBLE WEED	50 (15%)	250 (75%)	40 (12%)	340
<i>Rosa woodsii</i>	WOOD'S ROSE		50 (17%)	250 (83%)	300
<i>Cornus sericea</i>	RED-OSIER DOGWOOD	110 (33%)	110 (33%)	130 (38%)	350
		500	450	420	1,380

NOTES:

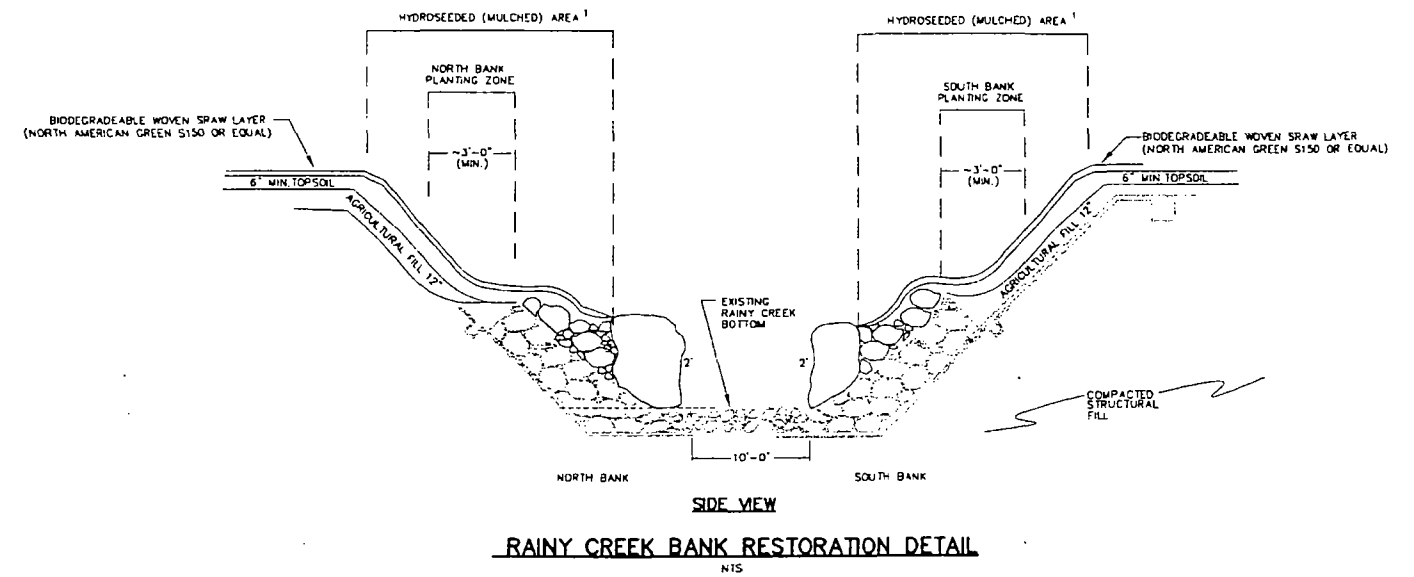
ON EACH ROW, PLANTS ARE 3'-4' APART. PLANTS ARE CLOSER IN ROW 1 AS COMPARED TO ROWS 2 AND 3

APPROXIMATE SPACING:

ROW 1 - 2.8'  
ROW 2 - 3.0'  
ROW 3 - 3.3'




BOTANICAL NAME	COMMON NAME	NUMBER OF PLANTS/ROW (%)		TOTAL
		NORTH BANK	SOUTH BANK	
<i>Populus trichocarpa</i>	BLACK COTTONWOOD	50 (20%)	200 (80%)	250
<i>Betula occidentalis</i>	WATER BIRCH	10 (20%)	40 (80%)	50
<i>Spiraea douglasii</i>	ROSE SPIREA	10 (20%)	40 (80%)	50
<i>Salix bebbiana</i>	BEBB WILLOW	60 (60%)	40 (40%)	100
<i>Alnus incana</i>	MOUNTAIN ALDER	75 (75%)	25 (25%)	100
<i>Alnus viridis sinuata</i>	SITKA ALDER	75 (75%)	25 (25%)	100
<i>Rosa nutkana</i>	NOTKA ROSE	40 (80%)	10 (20%)	50
		320	380	700



1. SEE SPECIFICATIONS FOR MIXTURE AND SEEDING RATE.

PRELIMINARY REVIEW COPY

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DESIGNED BY: P.B.	 U.S. DEPARTMENT OF TRANSPORTATION RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION JOHN A. VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER 55 BROADWAY, FEDERAL SQUARE CAMBRIDGE, MASSACHUSETTS 02142	CONTRACT SUPPORT PROVIDED BY: <b>CDM</b> Federal Programs Corporation ONE CAMBRIDGE PLAZA 30 HARTFORD STREET CAMBRIDGE, MASSACHUSETTS 02139	ASBESTOS REMOVAL PROJECT LIBBY, MONTANA  SCREENING PLANT	STREAM RESTORATION DETAILS	PROJECT NO: 4000
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APPROVED BY: P.J.B.					C-9
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